amateur radio

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COVER PHOTO

Jim Davis VK7NOW at the controls of his impressive Novice station. Further details on page 26.

Photo by Phillip Payne of "The Advocate", Burnie.

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QSP — SPECIALIST ADVICE NEEDED

It is now some time since the three Regional Conferences of the IARU decided upon a common amateur radio position to be put forward to Administrations when considering WARC79.

Amateur radio societies throughout the world adopted the common position with details and a model paper drafted by the dedicated band of workers led by IARU President Noel Eaton VE3CJ. The work of this international group is a continuing process but the IARU as a whole and many member societies have become most anxiously aware that the preparations for WARC79 require specialised technical treatment.

To this end IARU has sought the very best advice obtainable throughout the world for the benefit of a great many countries unable to secure access to this kind of information. The IARU in this respect acts as a co-ordinating agency and members may be assured that no stones are being left unturned both at the national and international levels.

However, the recent meeting chaired by Noel Eaton VE3CJ recognised the need for specialist advice to be obtainable during the actual WARC itself at short notice on any unforeseeable questions.

Thus, any comments relating to WARC79 matters would be welcome in this context. Although tremendous thought has been put into considering every conceivable angle relating to technical matters, there always seems to be something not given the proper perspective in advance.

D. A. WARDLAW VK3ADW, Federal President. ■

WIRELESS INSTITUTE OF AUSTRALIA

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JAS7778-49

An Amateur Radio Community Service Announcement!

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O.K., we believe we know the answers to these questions, but how can you identify the equipment?

First of all, check that your chosen dealer is a factory authorised agent or that he is an agent approved distributor. Is he prepared to spend a reasonable amount of time showing you the set, providing a genuine warranty, etc. or does he push a sealed carton under your nose with the suggestion that, e.g., "You are getting it cheap enough what more do you expect?"

Do ensure that your purchase of an A.C. operated transceiver is fitted with an Australian approved 3 core A.C. power cable and 3 pin plug. Look for the official approval numbers stamped on the cable and plug. Does it include an English language instruction manual? Amateur transceivers produced by the Yaesu Musen Co. Ltd. of Japan for authorised sale in Australia include the characteristic export blue and white covered English language manual, usually printed on glossy paper — not a black and white covered manual or a photo copy.

Check that the equipment is fitted with a 234V primary power transformer and carries the Yaesu factory 234V sticker, and that the serial number has not been removed or obliterated. As an example an authorised dealer imported FT-101E should include speech processor, cooling fan, crystals for all amateur bands 160M-10M with full coverage on all ranges, microphone, A.C. and D.C. power cables, accessory connectors, etc.

An FT-301S should have crystals installed for 80M-10M (28.5-29 MHz on 10M), reject control, connectors, microphone, VOX, crystal marker calibrator, etc.

In other words make sure that the set that you are purchasing is an Australian Standard export quality set and not an unauthorised imported ("bootlegged") job!

This space was donated in the interests of better amateur radio by Bail Electronic Services of Box Hill North, Melbourne, Australian Yaesu agent since 1963.

WIANEWS

REGULATIONS

A further letter from the Postal and Telecommunications Department arrived in March.

This was RB4/4/18 received on the 15th. This is the text —

Reference is made to your letter of 8 August 1977 concerning matters relating to the operation of the Amateur Service and in particular a request for permission for novice amateur licensees to use Variable Frequency Oscillator control.

The Department in investigating this matter agrees with the proposal and therefore is pleased to advise that, effective forthwith novice amateur stations may employ transmitter Variable Frequency Oscillator control.

This approval is on the understanding that the licensee of the novice amateur station shall take all steps necessary to ensure that emissions from his station are within the limits of the amateur frequency band authorised for novice station transmissions.

Would you please give this matter publicity through the venues available to the Institute. Offices of this Department have been notified accordingly.

NOVICE EXAMINATION

WIANEWS in April AR reported a meeting with Departmental officers during February. A further meeting with them was attended on 16th March during which the Department presented the WIA with a new draft syllabus for the Novice exams under cover of letter RB4/4/4 of that date. This draft went some way towards meeting the Federal Education Co-ordinator's objections that the first draft received in February lacked depth.

Unfortunately the new draft introduced a number of subjects which did not appear in the February draft. Further negotiations ensued with the result that some of these new subjects were deleted but the Department insisted upon the retention of several others. When these further negotiations concluded on 21st March, the Federal Education Co-ordinator, Graeme Scott VK3ZR, and his assistants sat down and revised the carefully prepared WIA syllabus to conform with the "final" draft of the Departmental syllabus. The WIA syllabus then became a study guide to give some indication to instructors of the depth of teaching to be given to candidates bearing in mind that Novice theory deals in an elementary manner with the subjects concerned.

This study guide has been submitted to the Department for endorsement as suitable for Novice level candidates and will be published as soon as possible thereafter.

However, a problem still appears to remain concerning the Novice theory question bank. One batch of nearly 200 questions (without answers) prepared by Graeme Scott, assisted by John Kolm VK3YJK, Brenda Edmonds VK3KT, and Danny McManus VK3NG, were handed over to the Department at the meeting on 16th March. Another similar batch is under preparation. The questions were culled from many sources and were carefully scrutinised before being considered suitable for submission. The reactions of the Department are awaited.

Meantime letter 7/3/78 of 17th March arrived from the Department confirming the points discussed with them at the meetings on 23rd February and 16th March. This letter confirmed that the WIA syllabus would serve admirably as a study guide and would be endorsed for that purpose. It also confirmed that the WIA Novice exam questions would be used for inclusion in the bank of Departmental questions for setting Novice exams. Once this bank has been established there seemed no reason why they should not be published by the WIA to assist students, stated the letter.

Thirdly the letter stated: "a joint WIA/Department committee will be established to discuss the activities and administration of the Amateur Radio Service in order to resolve any difference of opinion which may arise from time to time". The suggestion was made that the committee should meet at an early date to examine

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the issues raised in the submission to the Department of 8th August 1977 (published in AR September 1977).

1978 CONVENTION AGENDA ITEMS

Since this issue of AR will reach members after the Convention there is little point in quoting the Agenda Items received too late for inclusion in April AR. Nevertheless members might be interested in the general tenor of these items. VK1 Division submitted two items seeking discussion on enlarging the frequencies available for Novices. VK3 Division submitted 7 items dealing with —

Contributions for WARC79 from non-members; handling of QSL cards for non-members; common band segment for all grades of licensee; morse speed endorsements; Novice conditions; four tier licensing structure; RD contest SSB segment.

VK5 Division submitted 6 items on —

ATV calling channel on 2m; CB relations; Novices on WICEN frequencies; removal of log book requirement; engaging public relations firm; 10m beacons.

VK2 Division submitted 14 items —

25 kHz spacings on 2m; designation of numbers for 2m repeaters; review of 70cm band plan; 2m ATV liaison frequency; 70cm upper segment ATV frequency; common band for all licensees; 6m band repeaters; 10m band repeaters; band 4 TV segment; discuss Novice conditions; multimode stations one licence fee; compensation if bands lost; increased power for loss of 11m band.

This concludes the Agenda Items for this Convention. A considerable range of other matters will be discussed during the debates on the various Annual Reports, as well as latest reports about WARC79 preparations.

MEDIA PUBLICITY

At the end of March much time and effort were expended in preparations for a 25 minute programme on amateur radio for showing on the HSV7 network's "This week has seven days" on dates later in April. Many amateurs were involved under the chairmanship of Peter Wolfenden VK3ZPA, Executive Vice-Chairman. It is hoped to obtain a videotape of this show to add to the Executive's small library of videotapes available for loan to Divisions and clubs. These include the ARRL publicity films in colour, and the "Aerial Circus" videotape which is currently being edited and improved.

POSTAL MOTION AND EDP

A postal motion circulated to Divisions, seeking covering approval of the expenditure of funds to convert the WIA programmes to the 6700 computer, was passed. The Executive was also examining the costs of an in-house computer but it is expected these will still be too great for WIA requirements.

PUBLICATIONS COMMITTEE

One matter exercising the minds of Committee members is the dearth of material in AR suitable for Novices and SWLs. The reason is simple. AR is your journal. It cannot exist without articles and contributions by members. If there is very little suitable for Novices and SWLs it is because no one is contributing useful publishable material for them.

HANDBOOK REVISION AND CUSTOMS

At the Executive meeting on 23rd March Jim Lloyd VK3CDR/1 agreed to undertake the task of handling this revision. Bill Colborne VK3BP agreed to undertake an investigation into and give a report on the problems of Customs duties on amateur aerials and 70cm transmitting equipment. ■

QSP

SATELLITE ELECTROSTATIC CHARGES

"Communications satellites are usually placed in a geostationary orbit some 35,400 km above the earth, where local conditions are greatly influenced by the ionosphere below and the magnetosphere above. Plasma gases (hydrogen, helium, oxygen) escaping from the magnetosphere bombard satellites in geostationary orbit with electrically charged particles, sometimes causing a static electricity build up of dangerous proportions. The static electricity can then cause arcing on the satellites' surface that in turn can damage solar power cells and thermal insulation; and can generate interference with transmission of signals, resulting in garbled information and spurious switching of spacecraft functions." Continuing this article in December 1977 Telecommunication Journal news is given of the intention by the USAF to launch a satellite in January 1979 to study such effects.

CANADIAN CB

December 1977 Telecommunication Journal quotes a Canadian Department of Communications release that more than 600,000 Canadians hold licences for the General Radio Service Citizens' Band (CB) radios. This is over twice as many as one year ago and GRS operators now outnumber all other classes of Canadian radio users combined.

ARRL THREATENED WITH $50 MILLION LAW SUIT

The ARRL has been threatened with a law suit claiming damages of $50 million. This has been due to the ARRL adopting an advertising policy known as **The ARRL Code of Ethics.**

This policy would involve refusing advertisements in QST from traders who sell amateur gear to non-amateurs.

A group known as the Communications Attorney Service has threatened the law suit as they claim the policy contravenes US trade laws.

This confrontation could mean heavy liabilities for the ARRL and echoes the recent reply published in AR in response to a letter protesting the sale of **Amateur Linear Amplifiers** in CB publications. From Jan. 1978 CQ.

OFFICIAL INTEREST

The photograph indicates the amount of interest DOC (Canada) have in communicating with the Amateur fraternity.

Both FCC and DOC make extensive efforts to have their field officers attend ham and CB conventions to facilitate good communications with the users.

Perhaps the Australian authorities could take a leaf out of their book!

Photograph supplied by Vicom International Pty. Limited.

AMATEURS AND CB

"The radio hobbyist should be given a friendly hand into amateur radio before he or she gets caught up in the ideas of modifying their CB, building beams, adding linears and using any frequency one desires (piracy). Such a state of affairs does not benefit either service. Within CB the first step is to know that a hobby called amateur radio exists, the second is to offer an opportunity to get involved in the hobby, and the third step is to become sufficiently enthusiastic so as to personally commit oneself to studying for the amateur licence. As the CB user becomes interested in radio as a hobby the VKCB club members are able to direct the energies of such enthusiasts in the right direction." Report of activities of the Amateur and Citizen Radio (VKCB) Club, August 1977 to February 1978.

OT's MEET AGAIN

On 14th March 1978, a CW QSO between VK2BWC and VK3TJ revealed that these two had met in Hong Kong on February 2, 1939 and had not seen or heard of each other since that date.

QSL 3B8DA

All stations wishing to QSL 3B8DA and 3B7DA are requested to forward SAE and IRC to: Alex Mootoo, 3B8DA, 39 Brown Sequard Ave., Vacos, Mauritius.

VK1 REPEATER STOLEN

A message from the President of the WIA ACT Division advises that the ACT Division's channel 7 repeater installation on Mt. Ginini was stolen on the night of 1st/2nd April. This was a home brew rig and members are asked to keep an eye and ear open respecting anything unusual concerning such a rig. Please advise WIA ACT Division, Box 46, Canberra, 2600, on any information.

NSW DIVISION MORSE TAPES

A message from the NSW Division is that the morse tape loan service has been discontinued. This service has been replaced by the sale of pre-recorded C60 cassettes with any speed 5 to 12 w.p.m. Send stamped, self-addressed envelope with $2 per cassette, stating morse speed required, to WIA NSW Division, 14 Atchison Street, Crows Nest, NSW 2065. Price is post paid.

RTTY CONTEST

Are you making preparations to participate in the RTTY Section of the VK/ZL/O DX contest on the 7th/8th October. This RTTY contest will be administered on behalf of the Executive by the New South Wales RTTY group. The rules will be published shortly. ■

AFTERTHOUGHTS

An error occurred in the circuit (Fig. 2) of "Modifications To The Yaesu FT-100B", page 10, March '78 AR. The two capacitors in series between the collector and base of the BC208 transistor are shown as 0.002 uF. The correct value for each capacitor is 0.022 uF.

A SOLID STATE VIDEO MODULATION SYSTEM

AR, JULY 1977, page 6

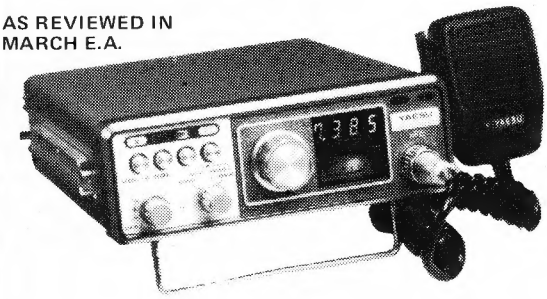
The 6.8k bias resistor, Fig. 2, should be returned to the collector of the MPS6514 transistor and not to the +12 volt rail as shown. ■

YAESU from DICK SMITH

WHEN YOU REALLY CONSIDER THE ALTERNATIVES – THERE ARE NONE!

COMPUTER TECHNOLOGY COMES TO VHF COMMUNICATIONS

AS REVIEWED IN MARCH E.A.



FABULOUS YAESU FT227R 2m FM MOBILE $335

WHAT ARE THE FREQUENCY SPLITS FOR REPEATERS?
Don't worry! Yaesu has computerised it. In addition to a conventional ±600kHz split, any transmitter offset frequency is memorised with the touch of a button.

WHAT WAS MY LAST FREQUENCY?
Don't check – a touch of a button will bring you back to the memorised channel instantly.

WHY ONE KNOB TO SELECT A CHANNEL OUT OF 800?
Yaesu utilises an 'OPTICAL COUPLING' system to select each channel in 10kHz steps and the channel may be offset 5kHz higher with the touch of a button. Thus 800 fully synthesised channels are provided with one knob and no rotary switches to get oxidised or noisy.

WHAT ARE THE OTHER FEATURES OF THE 227R?
Many. Just to name a few – tone burst accessed repeater operation; automatic final protection; busy channel indicator; high and low power output selection . . . we could go on & on.

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The fabulous FT-227R. Yours for the low, low Dick Smith price of only $335.00. Cat. D-2890

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Cat K-3132 .. .. $27.50

80m 30W AMPLIFIER KIT: Ideal for novice! F'glass pcb, 13.8V required. Full instructions.
Cat K-3133 .. .. $34.95

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Cat D-7052 (40mm) $5.50
Cat D-7054 (40mm) $6.60
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G6-144 2M COLINEAR: 117" high for repeater or fixed operation. 1kW rating, low SWR. 6dB gain over 1/2 wave dipole.
Cat D-4200 .. .. $89.00

WORLD ATLAS: A favourite with all DXers contains 20 pages of world maps. 4 colours.
Cat B-2268 .. .. $3.90

CO-AX SWITCHES: Will handle 1kW at 150 MHz. Save $4.00 while stocks last.
Cat D-5204 .. .. .. was $22.50 .. .. .. $17.50

LOW POWER TYPE: Handles 150W at 30MHz (although we've used them at 144MHz). 3 positions. **Cat D-5206 .. .. $11.75**

RG58RU CO-AX: Quality black co-ax at a bargain price –30 cents per metre for 100 metres or more. 52 ohm, light duty.
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144MHz (ERB2) Cat D-3802.. .. .. .. $25.90
These were selling for up to $39.00 each!

BUILD A BEAM: Our antenna brackets make it easy. Insulating nylon bracket accepts 10mm elements, up to 17mm boom.
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(Both these converters were selling for $35.50!)

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Cat D-5310 .. .. $21.50

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VHF WHIP ANTENNA: Suitable for 70 to 500 MHz depending on cut. Stainless steel & chrome, use with above base. **Cat D-4015 .. .. $5.00**

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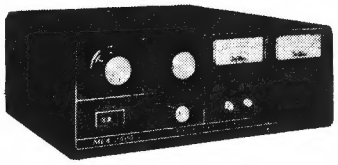
YAESU The radio



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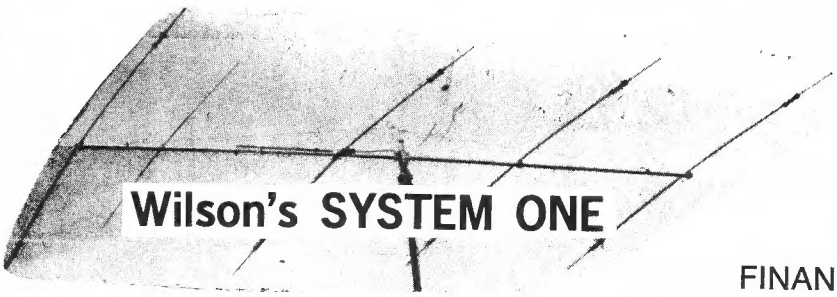

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	PA 2 —	12B	12 Watts	
	PA 2 —	25BL	25 Watts	P.O.A.

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HOW TO MAKE YOUR VFO AS SOLID AS A ROCK

John F. Ingham VK5KG
37 Second Avenue, Sefton Park 5083

John Ingham VK5KG in HF section of his shack.

From the beginning amateurs have strived to maintain frequency stability over their transmitters and receivers. Until now the methods which combine the ability to change frequency with the ability to maintain frequency have come under either of two headings.

(1) Stable variable frequency oscillators.

(2) Synthesized variable frequency oscillators.

Although the manufacturers of modern HF transceivers using stable VFOs claim drift figures such as 100 Hz/hour, they put in the proviso "after warm-up". Just how much drift occurs during warm-up and how long warm-up takes is not often stated, but figures like 2 kHz in the first hour are not uncommon. How many amateurs have the time to let their rigs warm up for an hour or so before use?

Synthesized variable frequency oscillators are coming into their own on VHF where operation (particularly on FM) is often confined to a finite number of channels each some 25 kilohertz apart. However HF operation requires continuous tuning and the ability to operate on any of an infinite number of closely spaced frequencies. This poses almost insoluble difficulties for the synthesized VFO approach.

So far, Frequency Locking has been limited to Automatic Frequency Control Systems which lock on to an existing carrier, e.g. AM, FM, TV, DSB. Even the proposal to lock a SSB receiver to a transmission by the use of a narrowband notch in the transmitter spectrum requires the transmission to be present, thus negating its advantage for long-term frequency watch-keeping or indeed transmission.

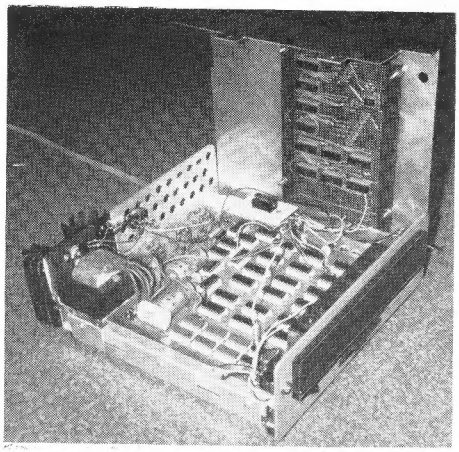
The system to be described is used with a Heathkit HW101 transceiver and a Heathkit SB650 digital readout. However the idea is adaptable to any transceiver and counter. (The SB650 computes and displays the actual operational frequency from the various local oscillators present in the transceiver; such a complex instrument is unnecessary for this project and a simple counter for just the VFO will suffice as long as the other local oscillators are crystal controlled — more on this later.)

Imagine a system which could record in a memory all the digits of the *"required"* frequency, compare these to those of the *"actual"* frequency and generate a correction voltage which is fed to the VFO. Because of the number of registers and comparitors required this approach would be expensive. However, to achieve our purpose of eliminating frequency drift, it is only necessary to compare the least significant digits (the righthand digit of a frequency readout). For as soon as drift commences it is this digit which will be first to change and as long as the rate of control is faster than the rate of drift all the other digits will stay constant and thus be of no consequence.

However by the use of only the least significant digit (LSD) an ambiguity of direction of control can occur. As an illustration suppose the "required" frequency has an LSD whose value is 9. Further, suppose that the frequency drifts *low* so that "actual" frequency has an LSD of 8. A comparison of 9 and 8 will show that the VFO has drifted *low* and the appropriate control voltage is generated. But, using the same starting LSD of 9, if the frequency drifts *high* by one unit, the displayed LSD is 0. A comparison of 9 and 0 will show that the VFO has drifted *low* (instead of high as has in fact happened) and so the control voltage generated will reinforce rather than correct the frequency drift.

To avoid this ambiguity the "required" LSD (no matter what it actually is) is offset to midrange between 0 and 9, i.e. 5. The "actual" display can now show a drift of as much as 4 units high or 5 units low before an incorrect control voltage is generated. In practice this is ample as any frequency drift is continuously corrected long before an error of this magnitude is allowed to accumulate. When the offset "actual" LSD digit is compared to the offset "required" LSD digit (which is now always "5") we get 3 possible output states from the comparator; frequency too high, frequency too low or frequency correct.

The *magnitude* of the error is determined and corrected as follows. A digitally controlled DC voltage source capable of producing a monotonic voltage staircase of 1024 steps has its output fed to the incremental tuning (or clarifier) line of the transceiver's VFO. When a frequency drift is detected by the above means the controlling voltage is incremented up or down (as appropriate) one step per frequency counter cycle until the error is cancelled



The stabiliser installed on vertical shield.

whereupon the controlling voltage is he[illegible] steady at the new level until further drift occurs.

For consistent control the voltage generator should be linear throughout its range, i.e. each up or down increment should lead to an identical increase or decrease in control voltage. It is more important, however, that the generator be monotonic — i.e. each positive (or negative) input increment leads to a positive (or negative) change in output voltage. Any part of the range which is not monotonic will lead to hunting of the VFO around one frequency.

To ensure that the circuit does not run out of range the output is initially centred on the middle step of the staircase so that both positive and negative frequency drift may be corrected.

In deciding the specifications for the project certain objectives must be kept in mind. The range of control must be adequate to handle the expected drift — approximately 3 kHz should be ampl[illegible] and this is primarily determined by the sensitivity of the transceiver's incremental tuning and the total available swing of the control voltage.

For a given range of control, the smallest change in control voltage should produce a barely perceptible change in note when listening to a CW signal. If the control is too fine the total available range of control will be restricted, if too coarse the operation of the device will be obvious. Also the smallest change in frequency must be smaller than the resolution of the counter, or the control voltage will continuously hunt or oscillate around the required level. As the maximum resolution of my counter is 10 Hz (see reference 1), I chose 3 Hz per step, a nice compromise of all the above factors.

The cycle rate of the counter plays an important part in determining the speed of correction after a step change in frequency (such as when the VFO knob is bumped) because there is only one correction step available for every counter cycle. Generally a counter's resolution is inversely proportional to its cycle rate. For example, the

cycle rate of my counter at 100 Hz resolution is 160 msec.; at 10 Hz it's 1.6 secs. (The *accuracy* of control achieved is the same for both ranges; the 100 Hz resolution gives "channels" at 100 Hz spacing, the 10 Hz gives 10 Hz spacing. The higher the resolution of the counter the smaller is the maximum permissible step-change in frequency, and the slower is the rate of correction of frequency. However, if the rate of control is faster than the rate of drift, and if there are no large jumps in frequency, effective control is maintained.)

DETAILS OF CIRCUIT

Referring now to the circuit diagram (Fig. 1), IC (b) is a 4 bit latch in which the required LSD is loaded in binary coded decimal form. IC (a) is a 4 bit programmable up/down decade counter which at the end of every frequency counter cycle is loaded with the *actual* LSD.

IC (c) is a 4 bit comparator whose A = B output is high only when the two LSDs are the same. If the two LSDs are not the same the low output from IC (c) is inverted in IC (d) and used to gate clock pulses (approximately 100 x the counter cycle rate) through IC (e) to the up-count input of IC (a). If the digit from IC (b) is larger than IC (a) only one or two clock pulses are required to step the digit in IC (a) up to that in IC (b) at which time IC (c) detects A = B and via IC (d) closes gate IC (e). If the digit from IC (b) is smaller than that from IC (a) 8 or 9 clock pulses will be required to step the digit in IC (a) right around the decade until IC (c) detects that both digits are the same and via IC (d) closes gate IC (e).

Gated clock pulses are also fed to IC (f) another programmable up/down decade counter identical to IC (a). Whenever IC (a) is loaded with the latest counter LSD, IC (f) is loaded with binary coded "5" which is "hard wired" into its programmable inputs. After IC (c) has allowed clocking to take place IC (f) will contain a digit either greater than 5 (if only one or two clock pulses were gated) or a digit less than 5 (if 8 or 9 clock pulses were required). IC (g), a 4 bit comparator identical to IC (c), continuously compares a binary "5" hard-wired into one set of inputs with the output of IC (f). If the digit in IC (f) is 5 both the used outputs of IC (g) are low. If the digit in IC (f) is greater than 5 the A > B output of IC (g) goes high; if less than 5 the A < B output goes high.

ICs (j), (k) and (l) are 4 bit programmable up/down binary counters which, together with the following R/2R digital-to-analog convertor, generate an increasing staircase output voltage when IC (j)'s "Up" input is pulsed, or a decreasing staircase output voltage when IC (j)'s "Down" input is pulsed. In order to give IC (j) one pulse per Frequency Counter cycle, a suitable pulse from IC (c) is gated by the A > B or A < B signals in IC (h) and IC (i).

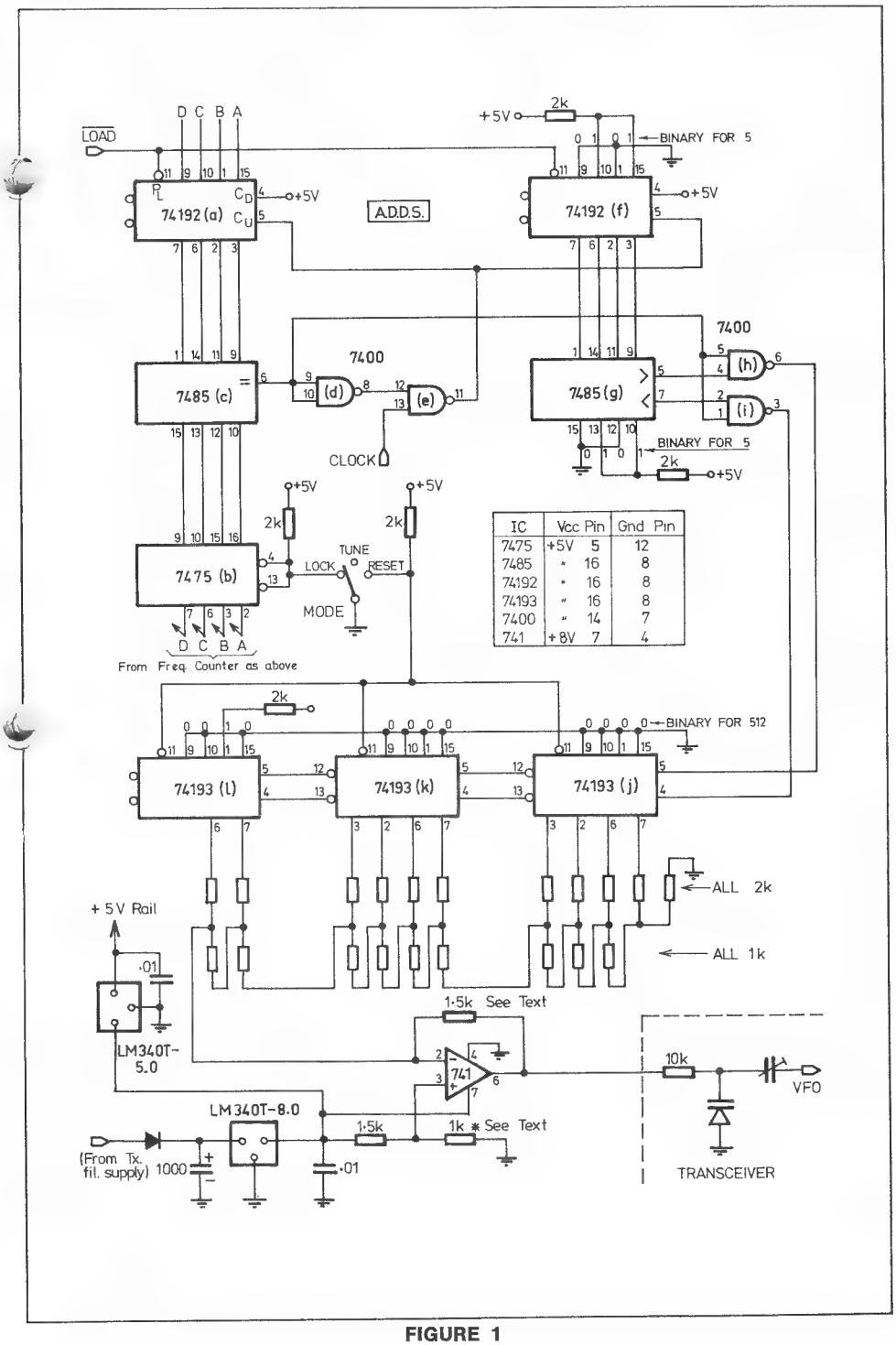
Whenever power is applied to the equipment the reset switch should be operated momentarily; this sets the output voltage to a point midway up the staircase by loading a hard-wired binary 512 (half way point of the possible 1024 steps) into the inputs of the 74193s. (Although this could be done automatically it is in any case desirable to have this function under manual control if need be.)

The 10 parallel output bits from ICs (j), (k) and (l) are converted to a staircase output voltage by the digital to analog converter, which is arranged so that in moving from the most to the least significant bit, each successive step has exactly half the control over the output voltage as the preceding one. The 741 Operational Amplifier IC (m) converts the available range of control voltage from the D/A converter to that required by the VFO and provides, if necessary, a DC offset.

CONSTRUCTIONAL DETAILS

I have not included a layout because my unit never proceeded past the initial layout which, although is a little messy, works well. However, if you use a Veroboard layout roughly similar to the layout of the circuit diagram, you should have no problems. The system works at a 1 or 2 Hz rate (the fastest rate is that of the clock which need to be only 100 x that of the cycle rate) so the layout from this viewpoint is non-critical.

To maintain monotonic operation of the D/A converter the resistors in the R/2R



IC	Vcc Pin	Gnd Pin
7475	+5V 5	12
7485	" 16	8
74192	" 16	8
74193	" 16	8
7400	" 14	7
741	+8V 7	4

FIGURE 1

circuit should be as close as possible to the same value. I purchased 100 x 2 KΩ resistors for only several dollars and by the use of a digital VOM chose those closest together in value for the R/2R network. The actual value is unimportant; the uniformity is. Two such resistors were used in parallel to make up each 1 KΩ resistance, thus ensuring smooth A/D performance.

The *range* of output voltage is determined by the precise value of the 1 K 5 Ω feedback resistor between pins 2 and 6 of IC (m). The 1 KΩ resistor marked * may be trimmed if compression of output voltage is experienced at either end of its range.

The connections from this circuit to the Heathkit Frequency Display SB650 are as follows —

BCD data —

A connect to IC18 pin 16
B connect to IC18 pin 15
C connect to IC18 pin 10
D connect to IC18 pin 9
— in SB650

Load connect to IC33 pin 6 in SB650.
Clock connect to IC6 pin 11 in SB650.
Ground connect to Ground in SB650.

Those who have an SB650 can refer to their unit's manual for more information. Those without will find an almost identical circuit described in AR not long ago (reference 2). (Even the same IC types, numbering and pin numbers!)

If you plan to use an altogether different counter, similar points no doubt can be found; however the following criteria must be met —

(1) BCD data lines connected to LSD BCD require positive logic, TTL level and polarity, connected as follows: Data line A to the least significant bit, B to the next least, and so on.

(2) Load requires a TTL level positive pulse at the completion of each counter cycle.

(3) Clock requires a TTL level continuous square wave some 100 times that of the counter cycle rate, either synchronous or asynchronous. (This may be developed by a suitable astable such as an LM 555.)

If your unit aids the drift instead of correcting it, transpose the connections between ICs (h) and (j), and (i) and (j).

If your transceiver always drifts in the one direction, more control range in that direction may be obtained by reprogramming the digital "512" hard-wired into the three 74193s to 768 or 256 as appropriate.

ADDITIONAL COMMENTS

Because this is a new approach to an old problem, all the possibilities of this circuit have not been worked out. For instance, a complete final frequency readout is not required for successful operation of this circuit. If your BFO and first local oscillator are crystal oscillators it would be acceptable to count the frequency of just the VFO.

Access to the least significant digit is all that is required. If you don't have a counter you don't even have to build a display as such — all that is required is a count of the LSD and a single 4 bit up counter such as 7490 fed from your VFO and gated on for any constant period of time. The actual value or meaning of the digit is unimportant so long as it gives an indication of frequency drift to the required resolution.

Of course, when using this frequency stabiliser, the use of a clarifier or incremental tuning is not possible as the circuit interprets this as drift and correct accordingly. However, the circuit could be modified to allow for a second latch to replace IC (b) whenever the clarifier was used. The clarifier itself would be a pot switched to replace the resistor marked thus *.

All that is needed to trouble shoot this unit is a VOM and a thorough understanding of how the unit is intended to operate. Key test points are as follows:

IC (c) pin 6 — always a "high" in Reset and Tune modes, dips momentarily in Lock mode each counter cycle only if *actual* LSD is different from *required* LSD.

IC (g) pin 6 (Unused) always a "high" in Reset and Tune modes; in Lock mode stays low (with one kick up each counter cycle) only if *actual* LSD is different from *required* LSD.

To test the A/D converter, connect the VOM to IC (m) pin 6 and feed the Clock into IC (j) pin 5 (disconnect other lead). The voltage should smoothly rise over entire range, falling back to minimum again. This movement should be smooth with no backwards steps (check connections and values of the R/2R network) and no flat spots at either end of the range (check IC (m) feedback resistor and offset resistor marked *).

To check operation with the transceiver, lock on to some convenient frequency where a heterodyne with your calibrator may be heard (e.g. 14.1 MHz). Now tune the VFO about 400 Hz high and allow the unit to do its work. Repeat over and over until the heterodyne suddenly disappears. Now switch to Reset and read the counter which will show the range available from centre. Repeat this procedure this time tuning 400 Hz low. These tests will determine the total range of control. Be alert for any abnormal jumps in the heterodyne or any flat spots where control is lost, as these faults point to a problem in the A/D converter.

ACKNOWLEDGEMENTS

Although the original concept of the described circuit is my own, I am greatly indebted to Howard Harvey VK5ZBE for his solution to the Rollover Ambiguity problem, the A/D converter, and his helpful comments during the development stage. I also thank Michael Phillips who made a number of valuable suggestions pertaining to the final manuscript.

REFERENCES

1. "Better Performance for your Heath SB650", J. F. Ingham, AR August 1976.
2. "A More Versatile Station Frequency Counter", D. J. McWilliam, AR November 1976. (Incidentally, the modifications described in 1 are also applicable to the unit described in 2.) ■

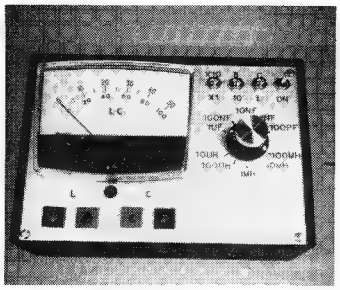
A DIRECT READING INDUCTANCE AND CAPACITANCE METER

Greg Brown VK3YGB
18 Hedderwick Street, Essendon 3040

A recent article (by A. Willcox, in "Television" of May 1976) described a direct-reading capacitance meter based on energy-storage considerations. The present author has extended this idea to measure both inductance and capacitance, and describes in detail the resulting test instrument.

Willcox's circuit operated by repetitively charging the unknown capacitor to a fixed voltage, then allowing it to discharge through the metering circuit. Provided that the fixed repetition period is long compared with the time-constant of capacitor and meter, the average current is proportional to the capacitance. The energy stored in a capacitance is $\frac{1}{2}CV^2$ and in an inductance $\frac{1}{2}LI^2$, so there appeared good reasons why the measurement concept could be extended to inductance, using the same oscillator and metering circuit, but charging the inductor with a fixed current.

The idea was soon tried, and proved to be practicable. A current is passed through the inductor to be measured, and allowed to stabilise. This current and the inductance value determine the stored energy. If the current flow is now diverted from the charging circuit into the metering circuit, it decays to zero with a time con-



View of Bridge.

stant proportioned to the inductance. Thus this repetitive discharge pulse produces a meter reading proportional to inductance (see analysis of Operation below).

Fast switching is essential for operation and is achieved by using non-saturating switches for controlling the inductor current. Wiring requiring low capacitance is space wired and not included on the PCB.

To calibrate the unit a standard capacitor and a standard inductor are required. Adjustments are provided for setting the oscillator frequency (see cal. C in schematic) and a divide reading by two (cal. ÷ 2) which doubles the oscillator frequency.

High frequency performance varies from one IC to another, and the 820 ohm resistor on the 100 pF/10 uH range may need to be adjusted to calibrate that range. This adjustment is best made by monitoring the oscillator frequency and calibrating for a 10 : 1 change when switching between the 100 pF and the 1000 pF (1 nF) ranges. Other adjustments set the inductor drive current (cal. L) and the meter shunt (cal. × 10) which is intended to be used only on the 1 uF range of capacitance.

Calibration should be made as follows:

1. Adjust cal. C (1 nF range) using standard capacitor.
2. Trim 820 ohm resistor to set 100 pF range.
3. Adjust ÷ 2 cal. for doubling of oscillator frequency (1 nF range).
4. Adjust cal. × 10 with the range switch set to 1 uF and a 1 uF capacitor connected, to produce an accurate reading when the × 10 switch is operated.
5. Adjust cal. L for an accurate reading with the standard inductor on the 100 uH or 1 mH ranges.

Battery Voltage: 6.5V to 9.0V.
Battery Drain: 4.5 mA to 10 mA, depending on range.
Residual reading:
Capacitance: Less than 1 pF.
Inductance: Less than 0.1 uH.

Applications for such an instrument seem to be endless and include easy measurement of the range of adjustable inductors and capacitors, junction capacitance of semiconductors (at approximately 5V), cable length, or if cable length is known, the impedance of the cable. Ferrite chokes and coils for transmitters and receivers may easily be wound and checked as hand capacitance effects are minimal. Recent uses have been the measurement of whip capacitance and the base loading coil inductance for an HF mobile antenna tuner for 20, 15 and 10 metres.

CONSTRUCTION

The instrument wiring is largely contained on a PCB, measuring 3.6 cm x 19.7 cm, which is housed in a 16.5 cm x 11.7 cm x 5.0 cm instrument case. Power is provided by six penlight cells and a LED indicator has been included to remind the operator the unit is on. This indicator has found many uses in battery powered equipment and consists of a complementary pair of transistors connected in an astable circuit. The benefit gained by using this

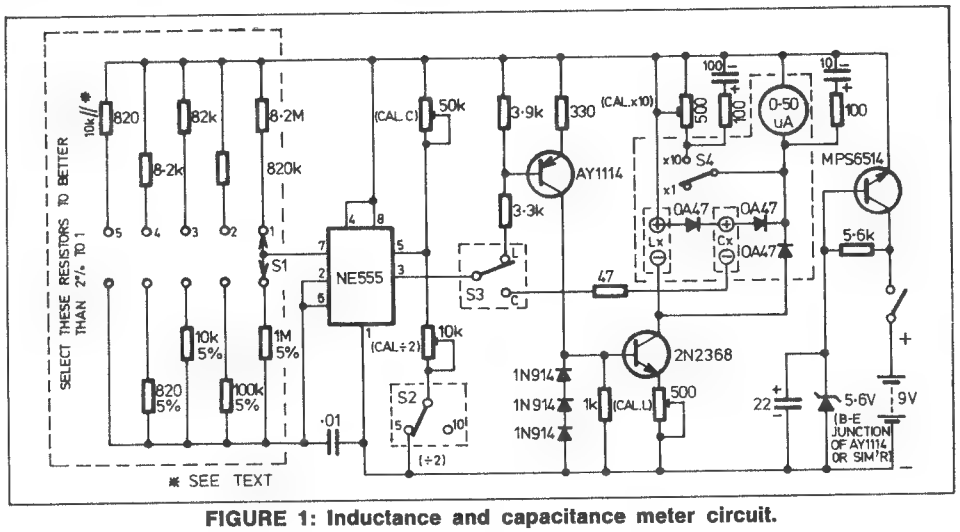


FIGURE 1: Inductance and capacitance meter circuit.

Capacitance FSD	S1 Position	S2 Position	S4 Position	Inductance RSD	S1 Position	S2 Position	S4 Position
50 pF	5	5	x 1	5.0 uH	5	5	x 1
100 pF	5	10	x 1	10 uH	5	10	x 1
500 pF	4	5	x 1	50 uH	4	5	x 1
1.0 nF	4	10	x 1	100 uH	4	10	x 1
5.0 nF	3	5	x 1	500 uH	3	5	x 1
10 nF	3	10	x 1	1.0 mH	3	10	x 1
50 nf	2	5	x 1	5.0 mH	2	5	x 1
100 nf	2	10	x 1	10 mH	2	10	x 1
500 nf	1	5	x 1	50 mH	1	5	x 1
1.0 uF	1	10	x 1	100 mH	1	10	x 1
5.0 uF	1	5	x 10				
10 uF	1	10	x 10				

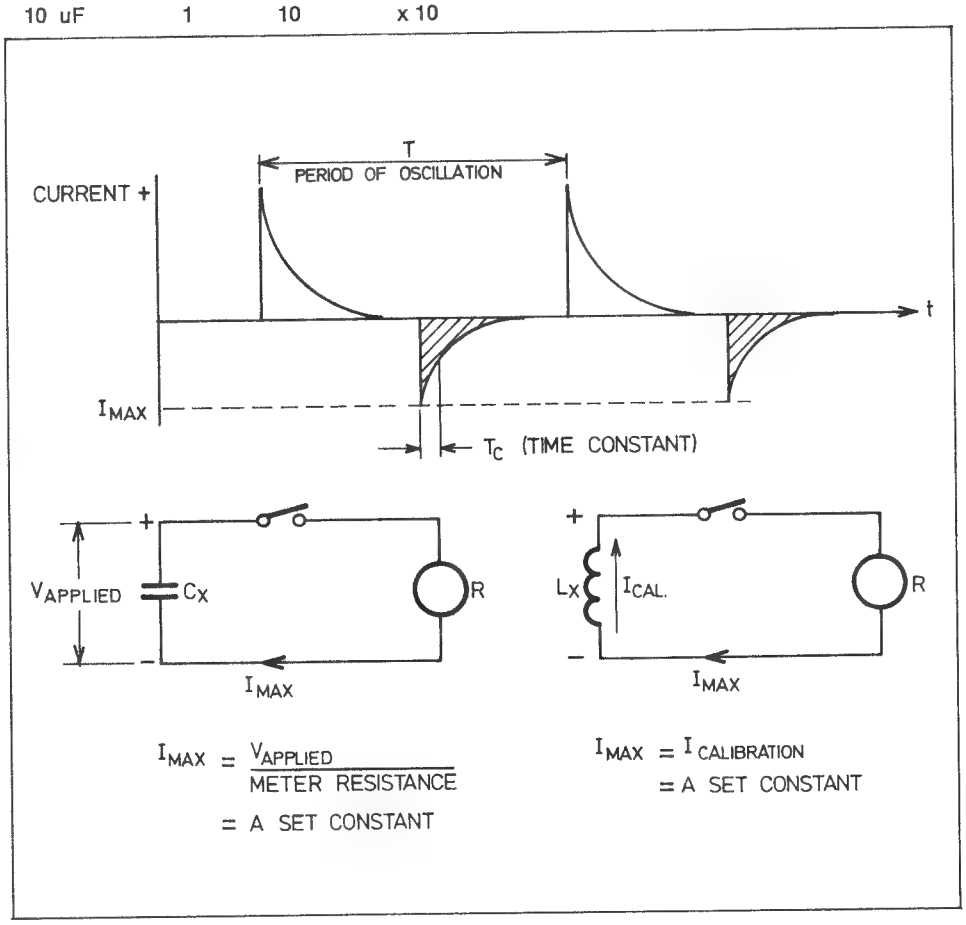


FIGURE 2: Current waveforms.

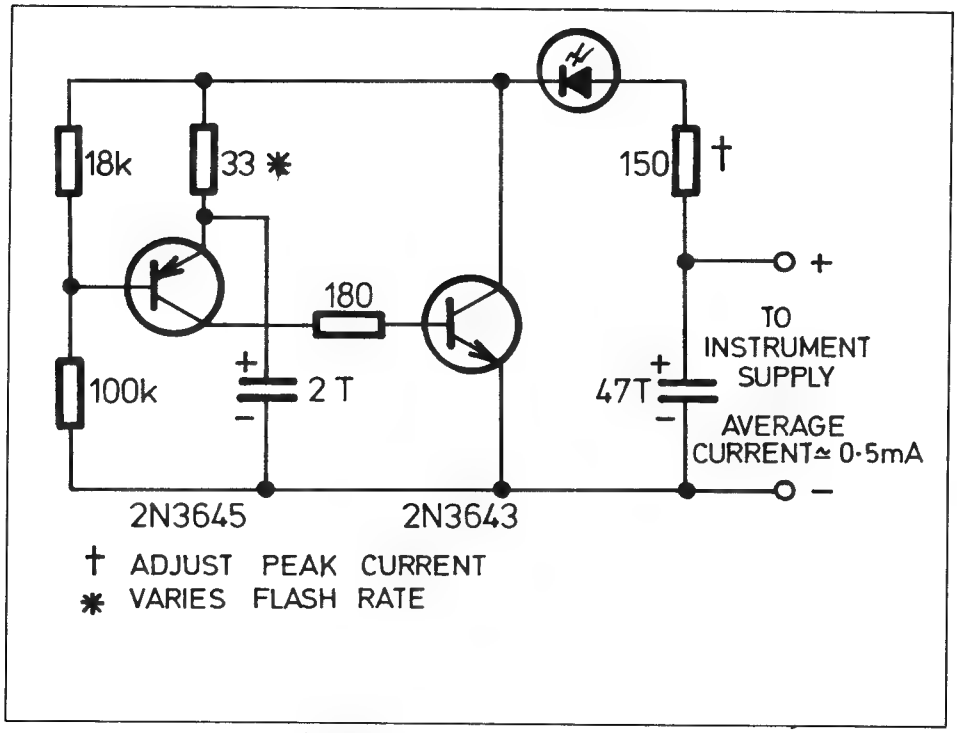


FIGURE 3: Battery saver circuit.

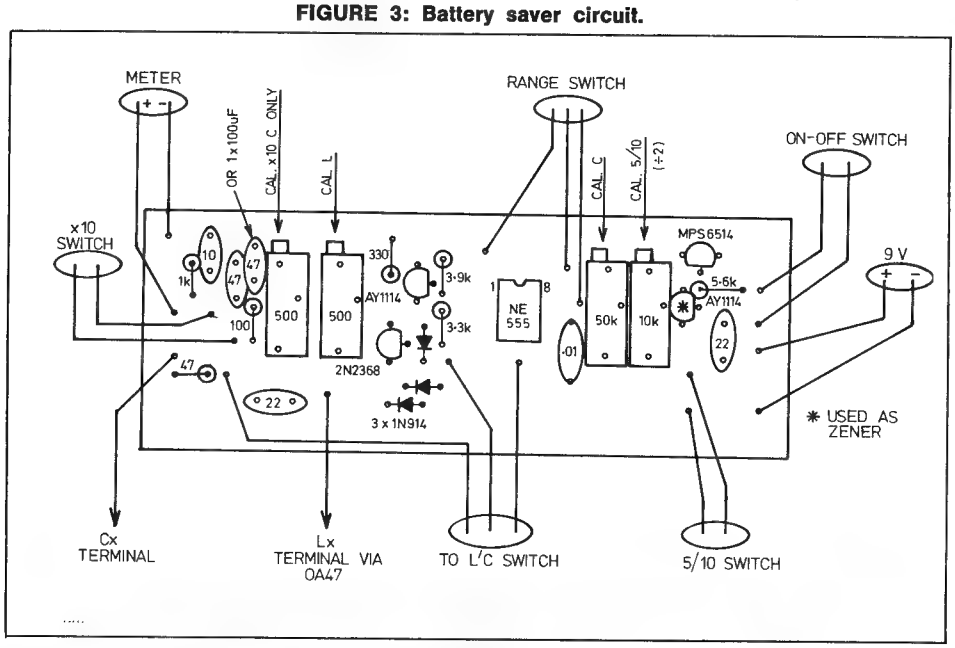


FIGURE 4: Board lay-out.

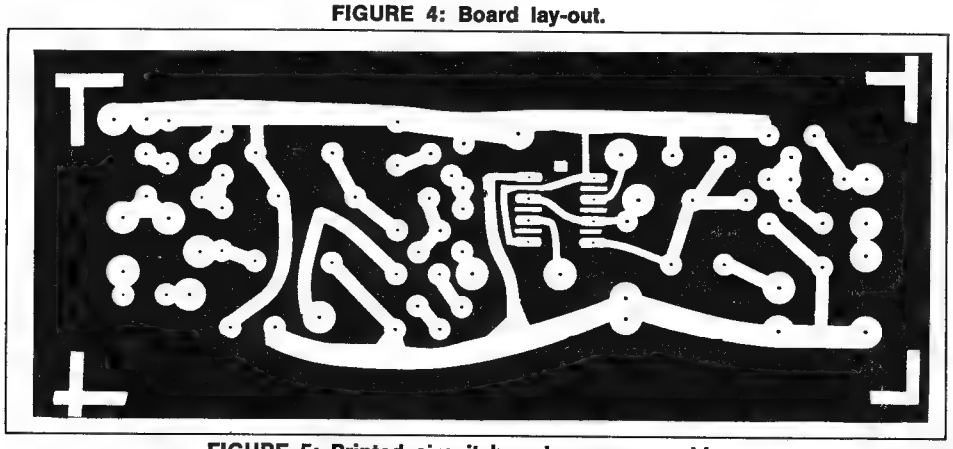


FIGURE 5: Printed circuit board — copper side.

circuit is that both transistors turn on together and their total current is passed through the LED. Average current drain is 0.5 mA, a small price to pay for power on indication. The indicator is wired on a separate PCB.

INDUCTOR MEASUREMENTS

When measuring inductors errors may arise due to approaching the self-resonant frequency. For measurements at not greater than 80 per cent of the self-resonant frequency

$$\text{Apparent Inductance} = \frac{L}{(1 - m^2)}$$

$$\text{where } m = \frac{\text{actual frequency}}{\text{self-resonant frequency}}$$

If m is less than 0.1 the correction is negligible.

In practice errors have only been apparent when measuring multi-layer coils of single section. An error of + 8% is typical for a coil of 15 mH wound with 770 turns of 18 B & S in a single section of 21 layers. Inductors of this construction are generally only suitable for low frequency applications. ■

QSP

RADIO FIELD DAY AT THE BLIND CITIZENS' COMMUNITY CENTRE

A field day and barbecue to demonstrate a number of aspects of amateur radio was held at the Kooyong Blind Citizens' Community Centre on Sunday, 4th December.

Special emphasis was given towards providing an understanding of the potential this recreation activity has for people with a sight disability. A number of pieces of equipment were demonstrated, and were afterwards available for interested people to handle and examine.

Some of the specific pieces of equipment on display included:

— 2 general coverage HF transceivers;
— VHF equipment covering the 2 metre band for local communication;
— Exhibits of general radio components;
— A talking calculator which was modified to work in conjunction with a digital volt meter.
— Demonstration of aerials;
— All band communications receiver;
— Morse code equipment with automatic dot memory.

A number of qualified operators gave their valuable assistance to make the day a success, and we thank them for this. They included — Rob Faravonie VK3ANI, Bob Byers (who is totally blind) VK3BHF, Dr. Gerald Unger VK3AOU, Bob Young VK3BIC, Bill Mudie VK3XS, Graham Scott VK3ZR, David Ditchfield VK3YSK and Collin Pomory VK3BLE.

It is hoped this field day will be the forereunner of other such activities, and may lead the formation of a club which can assist visually handicapped people to become more involved with this field.

Anyone wanting further information can contact Peter Rickards or David Ditchfield at the Association for the Blind, Kooyong, Phone 20 8701.

SELF-REGULATORY

The editorial in QST for Nov. '77 looks at the changes in their FCC amateur radio regulations from a period of over-regulation (especially for repeater stations and operation) some years ago to the present policy of easing restrictions generally. This, because of the acceptance that amateur radio is self-regulatory and self-policing. The example is quoted of the traditional image that amateur frequencies were available for use by all amateurs to the present situation of channelisation on VHF and UHF. This means that amateurs themselves must enter the spectrum management field in respect of their own bands and see to it that self-regulation and self-policy actually work.

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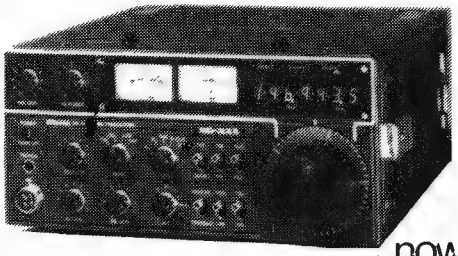

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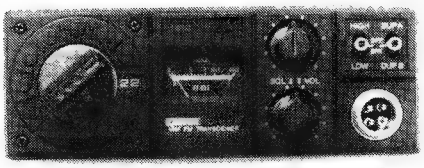

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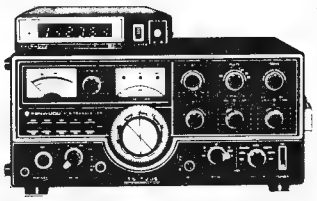

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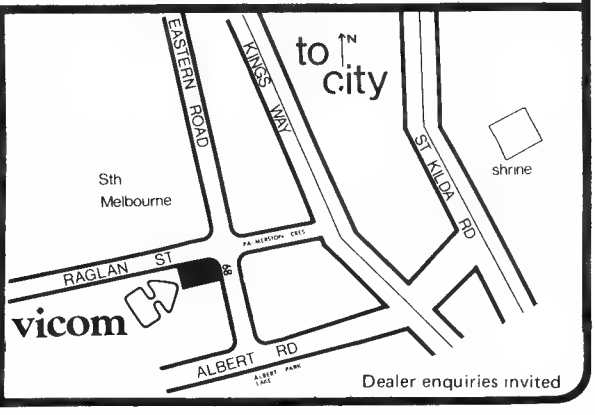

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John Moyle Memorial National Field Day. This contest uses all bands and modes, and has a section to suit just about everybody, whether portable, mobile or fixed. An ideal time to have a group or club outing, and operate as a multi-operator station.

AUGUST—SECOND OR THIRD WEEK-END
Remembrance Day Contest. The friendly contest, and the major Australian contest for everyone. All bands and modes may be used. This contest is between the Divisions of the WIA, with certificates awarded for the best scores in each section in each call area of VK, ZL and P29.

OCTOBER—FIRST AND SECOND WEEK-ENDS
VK/ZL/Oceania DX Contest. This is the only international contest sponsored by Australia and New Zealand. All bands 1.8 to 28 MHz may be used. Phone on first week-end and CW on the second. The contest is run alternatively by VK and ZL.

DECEMBER THROUGH JANUARY
Ross Hull VHF/UHF Memorial Contest. VHF and UHF bands, single operator only. There are 7 day and 48 hour sections, Phone, CW and Open. Ideal for the Z and Y calls.

DIVISIONAL CONTESTS
The majority of Divisions have their own contests, both interstate and intrastate. Refer to "Amateur Radio" or Divisional broadcasts for further details.

MAJOR OVERSEAS CONTESTS
February: ARRL DX Contest, Phone first week-end, CW second week-end.
March: ARRL DX Contest, Phone first week-end, CW second week-end. BARTG Spring RTTY Contest. "CQ", WW, WPX, SSB.
August: SARTG RTTY Contest. SEANET WW DX Contest. All Asian CW. European CW.
September: European Phone Contest.
October: RSGB 7 MHz CW. "CQ" WW DX Phone.
November: RSGB 7 MHz Phone. "CQ" WW DX CW.

There are many more contests, far too numerous to mention but when rules are available, they will appear in the Contest column of AR.

Your log will make any contest a success. ■

QSL CARDS — HOW TO QSL

QSL's are a vital requirement for most awards as before a certificate can be issued it is necessary that the applicant can show proof that he has contacted the stations claimed. The QSL card is still the only really acceptable way of doing this.

To have any value a QSL card must contain certain basic information about the QSO and if any of the following details are not included the recipient will be unable to use the card for award purposes.

The following information must be given:—

(1) **Your call sign** shown prominently.

(2) The words "To Radio .... confirming our QSO" or "This confirms QSO with. ... . " clearly showing the call sign of the station worked.

(3) **The location of your station,** including your **full** postal address. Remember, some stations will not have a current Call Book and otherwise will not be able to send their QSL to you in many instances without this information.

(4) **Date and time of QSO.** ALWAYS use GMT.

(5) **Band and Mode used.** If it was a QSO using the same mode both ways, mark this clearly as many awards are endorsed for a particular band and/or mode.

(6) **Signal report** using the standard RST report system.

When ordering QSL cards from a printer, remember that the above details are essential regardless of any additional information you may wish to add. A convenient way of presenting this information is to use the following format:

YOUR CALL SIGN
YOUR QTH

To Radio .. .. confirming our two-way QSO on . . .. MHz .... Mode at .. hrs. GMT on .... / /
Your signs here were R S T

It is recommended that a size of 5½ x 3½ inches should be used. This is a standard size fitting normal envelopes and conveniently handled by QSL Bureaux. If larger cards are used, they will require special envelopes and will not pack easily with other cards if sent in bulk.

If while writing out a QSL a mistake is made, **do not** make any attempt to alter it but write out a new card. Any card which has been altered is unacceptable for awards. ■

THE "Q" CODE AS USED BY RADIO AMATEURS

QRA What is the name of your station?
The name of my station is . ...

QRG Will you tell me my exact frequency (or that of . . . . .)?
Your exact frequency (or that of . . ..) is .. . kHz (or MHz).

QRH Does my frequency vary?
Your frequency varies.

QRI Is my note good?
Your note varies.

QRK What is the intelligibility of my signals (or those of .)?
The intelligibility of your signals (or those of . .) is . . . . . (1-5).

QRL Are you busy?
I am busy. Please do not interfere.

QRM Are you being interfered with?
I am being interfered with (1-5; nil, slightly, moderately, severely, extremely).

QRN Are you troubled by static?
I am troubled by static (1-5).

QRO Shall I increase power?
Increase power.

QRQ Shall I send faster?
Send faster (words per minute).

QRS Shall I send more slowly?
Send more slowly (. ... . words per minute).

QRT Shall I stop sending?
Stop sending.

QRU Have you anything for me?
I have nothing for you.

QRV Are you ready?
I am ready.

QRW Shall I inform . . . that you are calling him on .. kHz (or MHz)?
Please inform . . . that you are calling him on . kHz (or MHz).

QRX When will you call me again?
I will call you again at hours (on kHz) (or MHz).

QRZ Who is calling me?
You are being called by . . (on kHz) (or MHz).

QSA What is the strength of my signals (or those of .. .)?
The strength of your signals (or those of) is ... ... (1-5).

QSB Are my signals fading?
Your signals are fading.

QSL Can you acknowledge receipt?
I am acknowledging receipt.

QSO Can you communicate with .... direct (or by relay)?
I can communicate with . ... direct (or by relay through).

QSP Will you relay to . . ?
I will relay to . . .

QSV Shall I send a series of V's on this frequency (or . . kHz) (or MHz)?
Send a series of V's on this frequency (or .. . .. kHz) (or MHz).

QSW Will you send on .. kHz (or MHz)?
I am going to send on. . .. ... kHz (or MHz).

QSX Will you listen to . (call sign) . kHz (or MHz)?
I am listening to .. (call sign) on kHz (or MHz).

QSY Shall I change to transmission on another frequency?
Change to transmission on another frequency (or on kHz) (or MHz).

QSZ Shall I send each word or group more than once?
Send each word or group twice (or .. times).

QTC How many messages have you to send?
I have . . . messages for you (or . . .).

QTH What is your location?
My location is ... .

QUM May I resume normal working?
Normal working may be resumed.

DISTRESS CALLS

The letters "SOS" used in telegraphy and the word "MAYDAY" used in telephony indicates that the sending station is threatened by grave and imminent danger and requests immediate assistance.

Any licensee hearing such a call must cease transmissions and listen for details on the frequency used. He should answer the transmissions, if he can provided he does not interfere with another station answering the call. All relevant information should then be conveyed as quickly as possible to the police or other appropriate Government Department.

When a distress call is not fully justified the letters "XXX" in telegraphy or "PAN" in telephony indicate a state of urgency and the same procedure is followed as for distress signals. As with distress, all such calls are repeated three times.

Licensees are advised that in certain circumstances false distress calls have been initiated in recent years and it is imperative therefore to note or record all possible information which can be of use to the relief services.

International distress and safety frequencies are 500 kHz for telegraphy, 2182 kHz for telephony, 8.463 MHz for survival craft, 121.5 MHz aeronautical (plus others), 156.8 MHz for maritime mobile and 243 MHz survival. ■

A VISIT TO CHINA

Gil Sones VK3AUI
30 Moore Street, Box Hill, 3128

At the beginning of September, a party of 20 Australian tourists left Kowloon by train for the Chinese border. In this party there were two amateurs, Lionel VK3NM and Gil VK3AUI.

When the train reached the border town of Lo Wu everyone was required to get off. After exit formalities we crossed the bridge to the Chinese town of Shum Chun, where the immigration, health and customs formalities were carried out.

After these formalities the guides and interpreters assigned to the tour welcomed us. The welcome speech was accompanied by tea and cigarettes. This formal speech was to become very familiar as visitors are always welcomed and briefed at each place visited.

Then lunch was served in a dining hall and we received a lesson in the use of chopsticks. Very necessary as we were to use chopsticks for the next two weeks.

After lunch the tour proceeded by train to Kwangchow (Canton) and the start of the tour. Throughout the tour visits to places of interest were arranged and everyone was treated as a guest. Suggestions for specific interest items were noted and arranged whenever possible.

Photography was freely allowed except from aircraft during flights. No restrictions were placed at any other time on photography.

The tour, which was of fourteen days' duration, visited the towns of Kwangchow, Kweilin, Changsha, Shaoshan and Wuhan. These towns gave a considerable cross-section of China as well as showing some areas of scenic interest.

Visits were arranged to factories, schools, a commune, hospitals, a university and places of scenic interest

Also performances of plays, operas and concerts were included whenever they were available. The subject of these were usually revolutionary themes and they were played to packed houses.

The number of people doing manual labour is staggering and the amount of work done is very high. Mechanical aids are appearing but have not yet taken over in many cases.

Transport relies heavily on buses in the towns and people with handcarts for short distance goods transport. For longer distances trucks, tractors and trailers are used.

Between cities the train and the canal and river systems are used extensively. The railway system is heavily reliant on steam trains which are fuelled with coal.

Personal transport is by foot or by bicycle; there are 300 million bicycles in China and the traffic is little short of chaotic. The bicycles are quite dear at 200 Yuan or $100 Australian, which is four months salary for an average wage earner.

Wreaths at monument to Chairman Mao in Changsha on the first anniversary of his death.

Aqueduct in the country between Shaoshan and Changsha with children swimming in it.

On the subject cf money, the unit is the Yuan, which is approximately 50 cents Australian. All transactions must be in Yuan, unlike Russia, where goods are sold to tourists in western currency. The Yuan is divided into Jiao and Fen. There are 10 Fen to a Jiao and 10 Jiao to a Yuan. Both Yuan and Jiao are notes and the Fen are coins. It is quite novel to have a note which is worth 5 cents Australian.

Since all money to be spent must be converted at the bank to Yuan and only some travellers' cheques are negotiable, it is very wise to check up before you go there. In general bank notes are freely convertible but some of the popular varieties of travellers' cheques are either totally unacceptable or only occasionally acceptable. Information is available from China Travel Service in Hong Kong. The problem is not very great though, as prices are low and expenditure is really only on souvenirs.

Whilst travelling the communications systems and the broadcasting system were observed even though specific visits were not arranged.

The communications systems used were of interest. The phone lines were often of aerial construction, with both open wire lines and catenary cables. The cities had automatic telephones but trunks were all manually connected. The quantity of trunk lines was not great and the guides often had to book calls to make forward arrangements.

Local broadcast stations take Radio Peking off air and rebroadcast as well as using local programming. The broadcast stations cover the country. Foreign broadcasts are hard to copy as the QRM also covers the country very effectively and appears to emanate from a myriad of sources.

TV and FM broadcasting is in all major towns often using antennae placed in the middle of the town on a building. However, most TV sets are community owned due to the price of receivers which is 200 to 400 Yuan ($A100 to $A200). Wages are only 30 Yuan to 100 Yuan a month with an average monthly wage of 50 Yuan ($A25). This leaves only enough to save up for a bike and a few other luxuries and leaves TV a bad last.

Radio sets are more widespread but are dear with a 7 transistor model costing approximately 60 Yuan or $A30. The supply of radio parts is extensive with the more common parts freely available. Radio shops are often part of department stores or one half of a combined bicycle and radio shop. The radio shop sometimes has a small repair department.

Radio shops are full of people buying parts. Some of these people are probably hobbyists whilst others would be repairers of radio and electronic equipment.

The parts range from the basic resistors, capacitors, transistors, valves, transformers and loudspeakers right up to large transmitting type valves. Valve types 805 and 832 were on sale as well as some other larger unidentified types. These are probably for PA use or for industrial use.

To obtain some souvenirs I set out to purchase some small components in one shop and had no trouble in conveying my wishes to the assistant. Very soon the shop was full of interested shoppers anxious to see the fun. A chap from the repair department hurried forward and tried to guide my purchases along useful lines. He was anxious that I should obtain enough of the right parts to build something useful. Eventually, after much selection of the bits, I thanked the staff, paid the bill and left with my souvenirs.

Much to my astonishment only a few doors away was a disposals shop full of old CRO's, industrial electronic bits and a pile of command type condensers, large transmitting condensers, filter condensers and valves such as 832's, 805's and 833's. These were a most unexpected find in the middle of China at Wuhan. However, the bulk of them prevented me buying any as souvenirs.

By this time I had a large crowd following and I headed back to the hotel. This was another noticeable feature as people have not seen Westerners and tend to follow you just to see what you look like. They are very friendly and will help you find your way if you can communicate where you want to go.

Finally after two weeks touring China the party returned to Hong Kong and the West. During those two weeks we had been shown as much of China and what is being done there as was possible in a short time. ■

A CALL TO HELP THE CITIZENS RADIO SERVICE

D. Marshall VK4ZAF
23 Karowa Street, The Gap, Qld.

Amateur radio operators should take part in the Citizens Radio Service. This was the surprise proposal of Posts and Telecommunications Department administrative officer Mr. David Large, to the recent WIA Queensland Convention.

The suggestion came in his keynote address on the CRS, the Amateur Radio Service and the proposed Radio Communication Act.

"Perhaps the greatest benefit of the CRS to the ARS is intangible but it is a real benefit which I hope the WIA will exploit," he said.

"There are many CBers who have an interest in radio technology.

"These people form a large pool of future amateurs.

"Their interest and knowledge at the moment is minimal.

"It must annoy amateurs that so much inaccurate information is broadcast over CRS channels as facts.

"I would hope to see all amateurs taking a part in the CRS.

"This is seen by us as one way of injecting some professionalism into that service, not only technical expertise but operating techniques.

"By doing this, I would hope that many of the CBers would be encouraged to discover what radio is all about, to find out the pleasures through a hobby of amateur radio, which, properly controlled, allows contact with many people with many backgrounds in many countries."

Mr. Large said the decision to introduce the CRS was the most significant policy change in radio frequency management since 1948 when private VHF services were introduced.

Policies in force for 50 years had been challenged and found wanting.

Proposals for changes like that made by the WIA came at an opportune time.

Department philosophies, procedures and staffing were being reviewed.

The Radio Communication Act would be introduced next year replacing the Wireless Telegraphy Act of 1905.

Mr. Large said there was no doubt that UHF was the answer to the CB demand technically, and he believed, in the long term, economically.

Five years' parallel service was necessary for development and production of UHF equipment, particularly by Australian manufacturers.

Mr. Large said: "The interim period was not designed to allow for the massive development of HF services.

"Already the high standards of quality to be demanded from January 1, 1978, have been challenged but the Government's decision is clear.

"I cannot see any possibility of major amendments."

This was endorsed last month by Senator John Knight, who, speaking for the Minister Mr. Robinson, said: "In 1982, operators of HF equipment will only be allowed to continue under the auspices of the amateur radio service.

"Five years is sufficient time for people to obtain qualifications as amateur radio operators."

Mr. Large said: "That speech should be of some significance to everyone here."

Mr. Large said he was concerned existing regulations appeared to relate to controls over the amateur service which were inappropriate to 1977.

"Part of this is restrictions on examinations and qualifications for entry to the amateur service.

"There is a general move in the community towards greater reliance on self regulation in all forms of social activity.

"This will have an application to the Amateur Radio Service."

In commenting on the WIA proposals, he said: "The department is generally sympathetic with the broad thrust of the proposals.

"Generally, though with some modifications, I feel agreement will follow logically.

"If the Government is prepared to allow the ordinary citizen with no technical qualifications to use radio virtually without any restrictions, then the proposals of an organisation composed of technically qualified members who operate under a high standard of ethics should be acceptable.

"The proposals about a simpler examination and licensing system will be considered during a department review.

"You can be assured that any suggestion leading to more efficient management falls on receptive ears.

"Simply, drafting of the new Act gives the opportunity to completely review the regulations affecting the ARS.

"I should make clear the devotion the department has to protect the rights of the amateur operator.

"We well recognise the difficulty for the amateur service by people who deliberately pirated into the 11 m band.

"The department is adamant that this should not occur again.

"Senator Knight in his recent speech said: 'There is concern about advertisements in CB publications about the sale of equipment designed for the amateur service only. The Minister wishes it to be made quite clear to everyone concerned the Government will not stand by and allow pirating activities into other authorised services.'

"It is the Government's view that strong action should be taken to ensure that other authorised services are protected and that licensed operators in the CRS comply with regulations.

"It has been said that the loss of the 11 m band disadvantaged amateurs.

"Superficially, this appears to be so. However, this decision will provide long term benefits.

"One important benefit is that this exercise has brought the WIA and the department closer together.

"It has led to a more sympathetic approach to the WIA's role and position which will be reflected in the new Act and regulations.

"At the same time, the challenge to the Amateur Service by the CBer must force the WIA to look carefully at its own service.

"There is a belief that its present aims and objectives need reviewing.

"If this takes place, then I'm sure it will be beneficial."

Mr. Large said that in the past there had been suggestions that conserving the spectrum was synonymous with ensuring it wasn't fully used.

This view had resulted in an attitude of regulatory enforcement rather than management.

As a result, there had been stress placed on restrictive operator regulations within the services rather than management through technology.

"I believe that more stress has to be given to the control of the radio technology employed.

"This does not detract from the need to have enforcement provisions, but there has to be a better understanding of the department's objectives of management.

"It will be necessary in the new Act to put beyond doubt the Minister's power of control over all types of radio emission.

"This will allow for measures to deal with all forms of harmful interference to radio services.

"From this will flow the ability to set standards for radio equipment.

"It will be necessary to devise legislation procedure to control the use of unlicensed radio transmitting equipment and to increase the penalties."

Mr. Large said this would not be easy as it impinged on other legislation and practices.

It might be possible to determine the licensing of retailers through a tier system according to the types of equipment they sold. This seemed to be the answer. ■

MOBILING AROUND AUSTRALIA — SOME INTERESTING POINTS ON MOBILING OUR CONTINENT

Arthur Brown VK2IK

Well, we must see our own country the next time we go travelling." These were the conclusions of XYL Phyl and myself as we sat in our exchange flat in Surrey, England, pondering on our next tour. It was nearing the end of our 12 months (1975) stay in Britain during which time we had exchanged homes with a young teaching couple who were on "teacher exchange" in Sydney. From our base in Old Couldson we had toured in our campervan around 7,000 miles of Europe, 5,000 miles of Scandinavia and 8,000 miles of Britain. The latter two as G3TMO/M, but thereby hangs another tale.

PREPARATIONS FOR VEHICLE AND RADIOS

Having caravanned for years, and in the light of our 1975 experiences with the campervan, we figured that a well insulated Motor Home would be just the thing for touring Australia. Thus it was that by April 1977 we had obtained a Ford Transit Motorhome, had installed 2 and 6 Mx MR6 FM transceivers and a Sommerkamp TS288A SSB transceiver. Suitable mobile whips were checked out 10 to 160 Mx. English "G" whips 6 ft. long (previously used in Britain), 2 Mx and 6 Mx quarter wave whips and a range of home brew centre loaded 12 ft. whips to cover 10 to 160 Mx. In addition an extra section was carried to extend the 20 Mx whip to a full 16 ft. for stationary mobile operation. This latter whip was frequently used when the going became tough and conversely the 6 ft. helical was good for mobile use when signals were strong. There was at least 3 S points between these two antennas in favour of the 16 ft. whip.

The trip we planned would take 16 weeks with a daily average of 120 miles or 200 km. This subsequently worked out as planned to a distance of 21,000 km. We drafted out a schedule of places, stopover points, mail collection post offices and all the other data that would make the journey interesting from a scenic and historical point of view. In the months before we left the vehicle and spares had been organised and a hand throttle with a quick release mechanism was designed and fitted. This was a great boon as it relieved the leg fatigue normally encountered, and, in conjunction with a vacuum gauge also fitted, considerably reduced fuel consumption. In several preliminary journeys 14 m.p.g. was obtained, however, on the trip it worked out at 16 m.p.g.

Every endeavour was also made to eliminate electrical noises that intruded into the transceivers. Suppressors had been installed at all anticipated noisy spots, including a flywire mesh clipped over the ignition harness area. Still there was an S4 noise on most bands originating from the alternator regulator when mobile. No manner of filtering would clear it. Aubrey VK6XY, whilst we were mobile near Albany, W.A., came up with the answer, which was to install an electronic regulator in lieu of the vibrating reed type. This we did at Fremantle and it worked the trick with noise down to S2. A further reduction to S1 was achieved by the inclusion of a 0.05 MFD across the alternator field rectifiers. A larger value sent the regulator "beserk" into a two minute cycle of "hunting" with panel meters showing high then low as the charging rate changed. Noise levels were not constant and it was found that the addition of an earthing conductive rubber "car-sickness" strap installed at Darwin reduced the tyre static encountered on smooth bitumen surfaces.

TRAVELLERS NET

Prior to commencing the trip I had met up with Doug VK3YK, Keith VK6KC, Vic VK6NL and Harry VK6ZZ on the "Travellers

Net". This was to be a great source of interest and assurance if aid was needed. Throughout the entire trip, almost daily, we were able to QSO on 14.106 MHz at 0300 GMT. Other travellers there were on the net and they shared our pleasure in like manner. Other fixed stations occasionally joined the net, many of whom we were able to meet at their QTH. Not so Keith VK6KC — he is accessible only by boat or helicopter at the pearling fleet base at Kurie Bay, north of Broome.

ROUND AUSTRALIA TRIP

Our journey took us west to Adelaide via Menindee, Wentworth and Renmark, thence north via Pt. Augusta to the Flinders Ranges. Port Lincoln preceded our run to Ceduna, where I was able to see over the Satellite Tracking Station. The trip across the Nullabor on the new road with scenic lookouts on to the Great Australian Bight was more interesting than what we had been led to believe. The growth of small shrubs and salt bushes adjacent to the road gave the impression that landscape gardeners had been busy most of the way. Technically, it was interesting to see the site of the old Telegraph Station at Eucla on the WA side of the border. Unfortunately, the building, once the place of great activity as a relay link in the trans-Australia Telegraph of 1877 is slowly being inundated with sand and destroyed by vandals. Further west was also to be seen the buildings of Balladonia, another relay station now privately occupied and displaying discouraging notices for visitors. Around these buildings are remnants of the old telegraph lines going off across the plains to nowhere. In their place nowadays are the dishes of the microwave broadband bearers to be seen at regular intervals across the land.

It was our pleasure to meet some of the VK6's at Kalgoorlie and to see the historic mining sites of the Golden Mile at Coolgardie. Down south to Esperance and across to Albany and an escorted tour of the Canning Factory by Aubrey VK6XY and a visit to Vic VK6NL at Denmark was most enjoyable. We were impressed to see the giant Karrie trees of the Pemberton area — what wonderful towers they would be for amateur radio!

All around the coastline through Perth, Geraldton, Carnarvon and to Wyndham we visited scenic spots and VK6s'. At Exmouth I saw the relics of the old 200 MHz radar station, of particular interest to me as the equipment had been made in Sydney during the early 1940s. Others similar to it had been shipped around the Pacific for early warning of hostile aircraft. Not far away were the 13 masts of the US Naval Communications Station, the tallest being 1,271 ft.

From the cyclone tower of Onslow we finalised our plans to visit the mining towns of Tom Price and Wittenoom. This was a journey of 390 km on gravel and dust with no garages in between. The scenery was most rewarding, especially the gorges in the Hamersley Ranges and we consider that this area was one of the most colourful and rugged, perhaps more so than Central Australia.

Giant ant hills (termites) in Hammersley Ranges near Joffre Falls, W.A.

In a barge with other sightseers we traversed the Fitzroy River and admired the spectacular Geikie Gorge and saw numerous Johnston freshwater crocodiles. The Ranger assured us that, although the majority of crocodiles to be seen were about 6 ft. in length, there were a number of much larger ones about. In fact, he could look across the river each morning at cuppa time and see one old croc. sunning himself and this, he assured us, would be 200 years old and 16 ft. long. This information he gladly put across the "Travellers Net" for me for the benefit of some members who doubted that freshwater crocs could attain this length. Later at Kununurra we found an interesting sidelight on crocs in a brochure to quote "If by mistake you catch a freshwater crocodile, be careful you don't hurt him as they are protected". This is true and is not a comical suggestion as some have been killed by careless fishermen.

Fitzroy Crossing the "town" near Geikie, was a sight to behold. The surroundings littered by innumerable drink cans and bottles the one and only galvanised iron building served as hotel, store and petrol station. The store and petrol sections shut down at 12.30-1.30 p.m. but we finally obtained fuel at 2.30 p.m. We had no option but to wait as the next fuel was at Halls Creek, 300 km away. One interesting feature of the Northern Australia landscape is the prevalence of the "Upside-down", or Boab trees, varying in size with their enormous pulpy trunks. The biggest we saw was at Broome and measured 13 ft. in diameter.

Wyndham proved a surprise to us. We visualised flat country and mangrove swamps. True, there were mangroves, but there were also handsome mountains and a great lookout bluff, the Bastion of 1,100 ft., rewarded us with extensive views over Cambridge Gulf. At the modern Wyndham Hospital we surprised the nursing daughter of Con Murphy VK6PM, by asking her to come to the van to have a chat with her father in Perth. We had QSO'd him coming into town and had arranged a later sked.

At Kununurra and Lake Argyle we were impressed by the beauty of the river and size of the lakes. In parts the scenery of hills and water reminded us of the Norwegian Fjords. The Ord River irrigation project was also well worth the visit to see the lush crops of sorghum.

Katherine at the junction of the East West and North South roads had its Gorge on the Katherine River where scenes of the film "Jedda" had been filmed years earlier. The "Jedda" Rock was an impressive bluff part way along the gorge. At the camp ground nearby very friendly emus scavenged around the caravan sites and a pair of Bower Birds with apparent unconcern of the cars on the near approach road, darted in and out of their bower and colourful display of bright objects they had gathered.

A 350 km run to Darwin brought us to the northernmost city which is gradually losing some of the scars of its 1974 Christmas Day battering. The broadcast band is much occupied by Indonesian stations and the ABC competes for air space, which made us realise that Darwin is much nearer to Indonesia than any other Australian city. In fact, it was much this story from Port Hedland across to Darwin. In this whole region broadcast stations were difficult to receive and short wave reception of Radio Australia or BBC had to be used to keep up with current events. In Darwin I had the pleasure of meeting the local VK8's at their club rooms in the emergency centre concrete blockhouse.

Many relics and reminders of war-time Darwin are to be found, including along the Stuart Highway, the landing strips adjacent to the road. A visit along the Arnhem Highway was worthwhile as we

were able to view some of the water buffalo and at Humpty Doo to see the many variety of water birds that caused the ultimate failure of the dream to grow crops of rice.

On the run south it was good to camp at Mataranka Homestead, to swim in the hot spring and later to see the grave sites of the Elsey Station characters of "We of the Never Never". A little further south, after Daly Waters, we stopped at the monument to commemorate the valiant efforts of Sir Charles Todd and his co-workers in building the overland telegraph line a century ago. What privations these teams whent through just to get a single wire from Port Augusta to Darwin. In modern times, here we were in a mobile home with the ability to make radio contact easily all around Australia and with a little more effort to many parts of the world. In fact, the Stuart Highway has many points of interest communication wise as it virtually follows the route of the telegraph line and place names are synonymous with the telegraph relay stations. At these places operators received and transmitted the messages along the line.

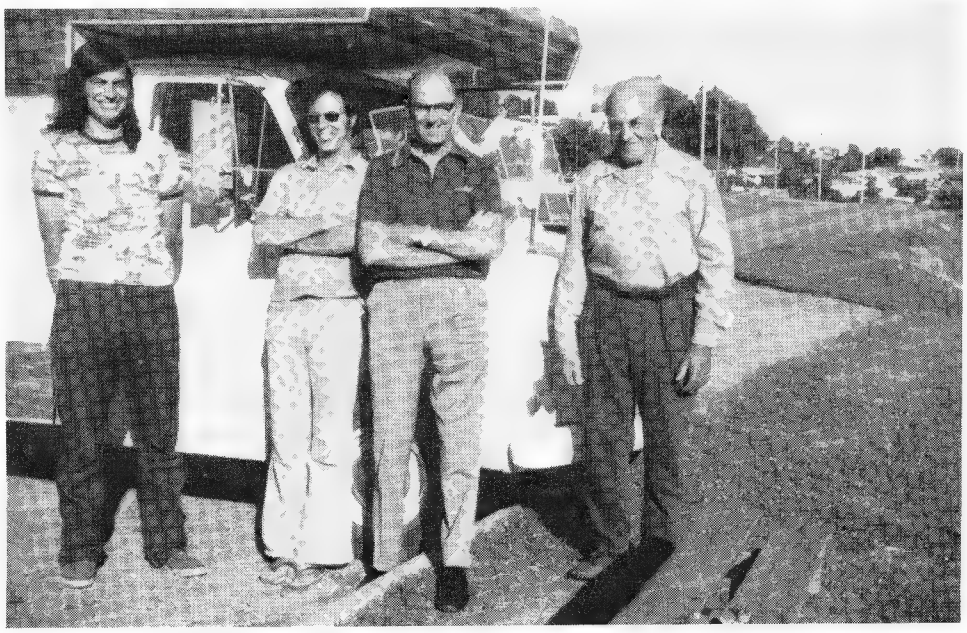
The overland telegraph line, completed in 1872, followed the route pioneered 10 years earlier in 1862 by John McDouall Stuart who, under heroic conditions, trekked through the unknown centre from Adelaide to what is now Darwin. A monument to him may be seen in the streets of Darwin.

At Alice Springs the original telegraph station and the Springs in the Todd River are being developed as a museum and recreational area. To be seen also by the observant travellers are many sections still in use of the 6,000 Oppenheimers iron poles installed in 1873 to combat the hungry jaws of termites. These ate away the wooden poles soon after their installation.

In a later era, the 1920-30s, reminders past and present are very much in evidence of the work of another pioneer. I refer to the Rev. John Flynn — "Flynn of the Inland". A monument to his memory is to be seen at Three Ways, north of Tennant Creek. At Alice Springs is the Flynn Memorial Church and a few kilometres to the west of town his grave site surmounted by one of the "Devil's Marbles" is in an appropriate setting. A living memory to him is the network of 13 Royal Flying Doctor radio bases spread around Australia, in many cases staffed by active radio amateurs. We were able to visit 8 of these during the tour.

It was a pleasure to meet the local Alice Springs VK8's at their club and to get a lot of helpful clues on seeing the area and on negotiating the "Track" down south.

The Stuart Highway from Alice to the S.A. border is an excellent road, however, the road west of Ayers Rock, particularly from Curtin Springs Homestead to Ayers Rock, and the Olgas, would be just about the worst and most used road in Australia. Thousands of tourists are inflicted with a corrugated unstabilised red sand road which no manner of grading will improve.



John G8LIF, Peter G3WCJ, Arthur VK2IK, Jack VK6EJ, Geraldton, W.A.

Buses, cars and caravans all suffer alike, and quite a few breakdowns were encountered. The Rock and the Olgas were all that the brochures showed, especially the sunrise and sunset scenes.

On now into South Australia after overnighting at Kulgera. What a road! Corrugations, bulldust and holes. Sure the road is wide enough and clearly defined but the hazards are difficult to avoid. The only way is to drive with extreme caution. We found that by reducing tyre pressure and not exceeding 60 km per hour that we came through unscathed. Not so cautious were others who evidently taking it too fast produced the hexagonal and octagonal wheels which littered the highway. Unlucky also was the semi-trailer driver from Adelaide who piled up near Marla Bore, 300 km north of Coober Pedy. His fuel tank had fatigued off the chassis and fell under the wheels. After a couple of days at the crash site we resumed the journey to Coober Pedy, a most interesting spot and, after Woomera, a more or less normal journey home via Adelaide and Broken Hill. Queensland was not included in our itinerary as we had previously toured up the east coast of Australia as far as Cairns.

WARNING FOR TRAVELLERS

Several comments are worth noting for future travellers. Bob VK6CIJ, of Carnarvon, an owner-driver of a road train, warned us! Give the trains a wide berth and priority on one track roads, as a foot of movement of the prime mover will cause a 4 ft. waggle to the tail of the third trailer! It tests the nerves and skill to pass these going in opposite directions, especially on a curve and you DON'T pass them except uphill going the same way.

Animals on the road are a frequent hazard, especially at night and must be given credit for being unpredictable. The main problems are kangaroos, emus, cattle and sheep in about that order. Fortunately we missed them all, but there were some narrow shaves. Although we didn't fit bullbars, these could be an advantage. We did, however fit a windscreen mesh which saved the screen several times.

In planning a trip such as ours, it is more economical to travel anticlockwise around Australia as this is the direction of prevailing winds. For timing reasons we were committed for clockwise travel which made our fuel costs higher than it would have been. ■

QSP

CASUALTY
In mid-April 1977 Dr. Glen Eschtruth, 9Q5GE/K8MZG was murdered in the Kapanga area of Zaire by the invaders into the southern part of that country. From a report in Worldradio Aug. '77.

MARCONI 75th ANNIVERSARY STATION
From ARRL comes the news of a special event station KM1CC from 14th to 22nd January operative on all bands and modes from the original Marconi station location in South Wellfleet, Mass. Another special station to be operated by RSGB will be located at Poldu, England, during the same period. QSL to KM1CC via W1GAY.

NETHERLANDS CONTROLS
Radio Communication Nov. '77 quotes an extract from a notice issued by the Radio Central Service of the Netherlands P. and T. Service which basically advises that as a licence is required for all radio transmitting equipment a new registration system now operates from 1.7.1977. A personal registration certificate is required to be kept with the station and all transmitters, transceivers, transverters and linear amplifiers must have a registration sticker attached to them. This new system forms part of the licence conditions. The police can seize any unregistered equipment.

FAX
The UK permits the use of facsimile signals on 7, 14, 21, 28 and 144 MHz bands. Radio Communications Nov. '77 says the interest in this mode of picture transmission is increasing and BARTG would like to hear from anybody using it.

EME
"The WAC Certificate has been received to confirm that VK2AMW has Worked All Countries on the 70 cm band. Without a doubt the first WAC on UHF (or VHF for that matter) for any station in this part of the world". The Illawarra "Propagator" for Nov. '77.

EMONA electronics

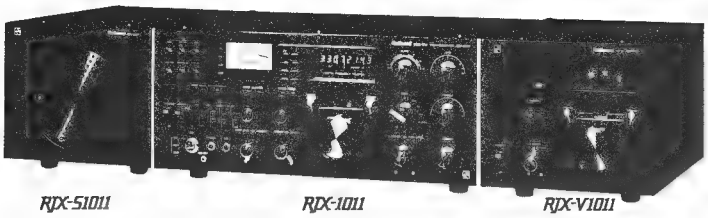
CBC BANK BUILDING, HAYMARKET PHONE: 212 4815
Room 208/661 GEORGE STREET, SYDNEY. AH: 398 6378

MAIL ORDERS: Box K21, Haymarket NSW, 2000, Australia

WRITE, PHONE OR CALL IN!

NEW-NEW-NEW

National ***RJX SERIES***



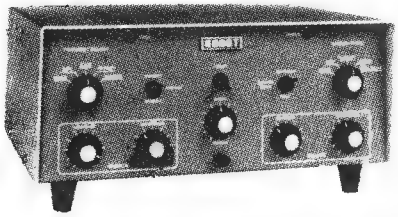
RJX-S1011 RJX-1011 RJX-V1011

A Unique New SSB/CW Transceiver For Amateur Communications

There is no substitute for quality, performance, or the satisfaction of owning the very best. Hence, the incomparable National RJX-1011 amateur transceiver. The RJX-1011 covers all amateur bands 1.8-30 MHz (160-10 metres). It utilizes advanced Phase-Lock-Loop circuitry with dual gate MOS FETs at all critical RF amplifier and mixer stages. There's a rotating dial for easy band-scanning and an electronic frequency counter with digital readout and a memory display that remembers frequencies at the flip of a switch. And that's just the beginning. Matching speaker unit RJX-S1011 and complete external VFO RJX-V1011 also available.

For further information and specifications write, phone or call in!

ALSO AVAILABLE: • MIZUHO BCL antenna tuners, preselectors, marker generators • KATSUMI electronic keyers • SENCOR DVM • DRAKE TVI filters • OSKERBLOCK SWR-200 & SWR-300 meters.



ORDER YOUR ROBOT MODEL 400 SSTV CONVERTER NOW!

With the Robot 400 you just plug it into your transceiver, connect a TV monitor or your home set with the optional Robot RF adapter kit, tune to 14.230, and you're operating SSTV.

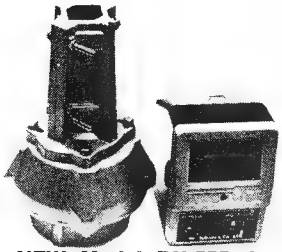
Go RTTY — EMONA'S silent way!

New Model 75 RTTY TO VIDEO CONVERTER

Features:
4 speeds (60, 66, 75, 100 wpm)
Biult-in T.U. with 3 shifts (170, 425, 850 Hz)
32 character x 16 line video output with scrolling
Connects directly to rceiver audio & video monitor

New Model 150 RTTY KEYBOARD

Features:
4 speeds (60, 66, 75, 100 wpm)
Built-in AFSK with 3 shifts (170, 425, 850 Hz)
Automatic CR & LF at end of 64 or 72 character line
Built-in low shoft CW ID provision



NEW: Medium-Sized Ham Antenna Rotator — FU 400.

Constructed for long trouble-free operation. 200 kg vertical weight capacity. Extra heavy duty disc brake that prevents wind-milling.

NEW Model DX-555 Counter-Generator

Generator:
440 kHz to 30 MHz in 3 ranges.
Output displayed on counter and available at iack on rear panel 600 Hz modulation for AM receivers.

Counter:
5 digit display, 7 digit readout capability. 10 Hz to over 30 MHz (250 MHz with prescaler). Input level 20m Vrms to 5 Vrms (Prescaler 200m Vrms to 2 Vrms). Base oscillator beats directly against WWV.

NEW COUNTER-GENERATOR
Two vital pieces of test equipment in one.

LINEAR AMPLIFIERS

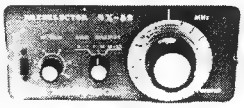
SCS: HF3-100L2, 3-30 MHz bi-linear amplifier.
SCS: 2M10-80L2, 144-148 MHz, FM/SSB linear amplifier.
METRON: MA1000, all solid state, 1 kW amateur band linear amplifier — lightweight, compact and rugged.
YAESU MUSEN: FL-2100B, 80-10m linear amplifier.

ANTENNAS:

HUSTLER: 4-BTV — vertical trap antenna.
HUSTLER: Mobile vertical trap antenna (80-10m).
CUSHCRAFT: ATB-34, 4 element beam, 10-15-20m
WILSON'S SYSTEM ONE: TRIBAND ANTENNA — A DXer's delight, operating 20 m on a full 26 ft. boom with 4 elements on 20-15, and 5 elements on 10. Gain 10 dB!

RF PREAMPLIFIERS FOR 3-30 MHz BAND:

Model SX-59 for use with transceivers.



SPECIFICATIONS:
Frequency range 3-30 MHz in 3 bands; 3-7, 7-14, 14-30 MHz
Gain 20 dB nom. (at 7 MHz), front panel variable control
Attenuator —20 dB attenuation selectable from front panel control.
Imped. 50 or 70 ohm systems, UHF connectors on rear panel.

Switching requirements: requires external relay contact switching when used with transceivers. Remote contacts readily available from most amateur HF transceivers, including TS-510, TS-511, TS-520, TS-820, FT-101, FT-401, FT-200 and FT-201.

AMATEUR BAND TRANSCEIVERS:

NEW — NATIONAL: RJX1011 — Unique SSB/CW 160-10m transceiver with digital readout and matching speaker and external VFO.
TRIO KENWOOD: TS520S — SSB/CW, 160-10 metres, with optional digital readout.
TRIO KENWOOD: TS820S, 160-10 metres digital readout.
TRIO KENWOOD: TS820, 160-10 metres.
TRIO KENWOOD: TS700A — 144-148 MHz all mode transceiver.
TRIO KENWOOD: TS600A — 50-54 MHz all mode transceiver.
TRIO KENWOOD: TR-7400A — 144-148 MHz FM transceiver.
YAESU MUSEN: FT101E — 160-10 metres, AM, SSB, CW transceiver.
YAESU MUSEN: FT301 series, 160-10m AM, SSB, CW transceiver.

RECEIVERS:

DRAKE: SSR-1 Wadley Loop receiver.
TRIO KENWOOD: R300 general coverage BCL receiver.
YAESU MUSEN: FRG-7 general coverage Rx, Wadley Loop System.
NATIONAL: DR48 (RF4800) — general coverage, digital dial, communications and BCL receiver.

ALL AMATEUR RADIO EQUIPMENT IS AVAILABLE ON 10% DEPOSIT TO APPROVED BUYERS!

Check EMONA'S most COMPETITIVE Prices!

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FROM **FDK** OF JAPAN COMES THE LATEST MILITARY TECHNOLOGY AT AMATEUR PRICES, THE

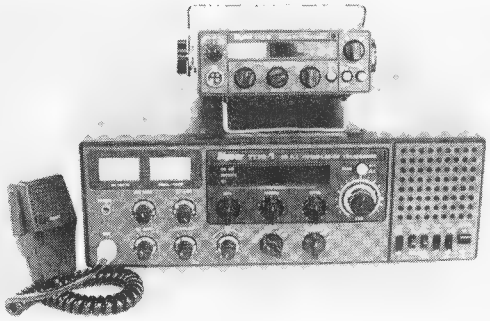
Bigear VHF-UHF TRANSCEIVERS!

Type 1 —
2m FM SSB CW PLL SYNTHESIZED MOBILE BASE TRANSCEIVER

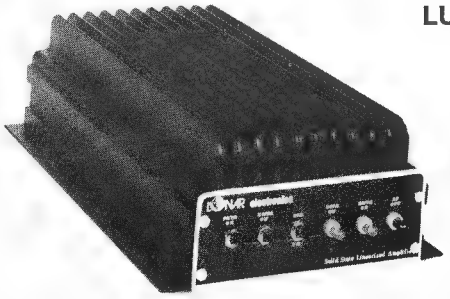
- 144 - 148 MHz, PLL digital synthesizer system
  FM: 800 channels (5 kHz step)
  SSB: 400 channels (10 kHz step) plus VXO system (± 7 kHz)
- AC 117/240V, DC 13.8V, two-step power supply
- Digital display system (using a large-sized LED) provides reading up to six figures

Type 2 — **2m FM PLL SYNTHESIZED MOBILE TRANSCEIVER**

- 144 - 148 MHz, PLL digital synthesizer system (800 channels)
- A large-sized LED, digital display system provides readings up to six figures
- Easy-operating separate and selective mechanism displayed by the frequency unit for wider operation
- Transmitting output: 25W/1W, two-step selector switch



WRITE OR CALL FOR FURTHER SPECS!

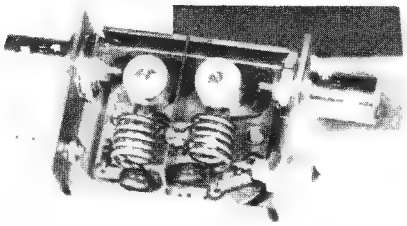


LUNAR 2 METRE LINEAR AMPLIFIER - 2M80P

- 10W Input — 80W Output nom.
- Low Power Input Yields nom. 10 dB gain
- Covers entire Amateur Band w/o Tuning
- Built-in Receive Preamplifier
- Automatic T-R Switching or Hard Keying
- Remote Control Head Avail. Separately
- Exceeds FCC R&O 20777 Requirements of —60 dB
- Variable T-R Delay for SSB/CW use
- Preamp & Power Amp Independently Controllable
- Preamp nom. 11 dB gain 2½ dB Overall NF
- Functionally Designed Package

Models available for the 148-174 MHz bands

LUNAR electronics



LUNAR PREAMPS
Originally developed by Chip Angle, the Angle-linear receiving preamplifiers meet the most demanding needs where low noise is important.

VHF ANTENNAS:
HUSTLER: G6-144A, 6 dB gain base colinear.
HUSTLER: CGT-144, 5.2 dB gain mobile colinear trunk-lip mt.
HUSTLER: BBLT-144, 5/8 mobile with trunk lip mount/spring
CUSHCRAFT: RINGO ARX-2
CUSHCRAFT: A147-20T, 20 element twist.
CUSHCRAFT: A144-11 11 element

OSKERBLOCK SWR-300
UNIVERSAL SWR METER FOR HF, VHF and UHF!

INTRODUCING DenTron

LINEAR AMPLIFIERS:

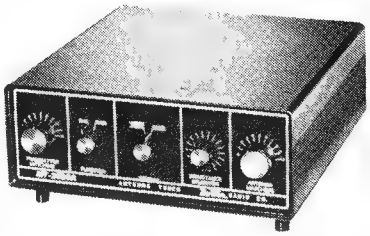
DENTRON RADIO CO.: MLA-2500, 160-10m linear amplifier.
DENTRON RADIO CO.: MLA-1200 — 80-10m linear amplifier.
DENTRON RADIO: 160-10L Superamp, 160-10m linear amplifier.

ANTENNA TUNERS:

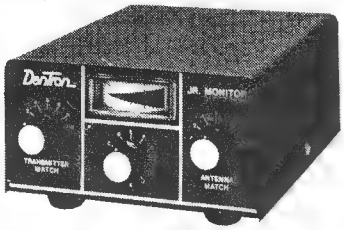
DENTRON MT-3000A **DENTRON** 160-10AT **DENTRON** 80-10AT

The MT-2000A

The DenTron MT-2000A antenna tuner, an economical full power tuner designed to handle virtually any type of antenna, whether it be a vertical, beam, quad, dipole, or long wire. The sleek styling and low profile of the MT-2000A is certainly beautiful, but be assured that isn't all you're buying. The MT-2000A is designed and engineered using heavy duty all-metal cabinetry and high quality American components throughout. When you consider the MT-2000A's unique features — front panel coax bypass switching, front panel lighting protection antenna grounding switch, 3 kW PEP handling capability and built-in 3 core balun for balanced feed line, we're sure you'll decide to buy American and stay with DenTron.



DENTRON MLA-2500
DenTron Radio has packed all the features a linear amplifier should have into their new MLA-2500. Any Ham who works it can tell you the MLA-2500 really was built to make amateur radio more fun.



The Jr. MONITOR

Call it what you will — antenna tuner, transmatch, matchbox, or matching network, the JR. MONITOR has it all wrapped up in one neat 5¼ in. w. x 2¾ in. h. x 6 in. d. all metal cabinet. Think of the unlimited possibilities you'll have for experimenting with dozens of antennas! For instance, the DenTron All Band Doublet fed with balanced feed line hooked to the JR. MONITOR covers 1.8-30 MHz . . . or try this mobile suggestion: 108 in. mobile whip fed with coax to the JR. MONITOR located under the dash will give you 10-40 metre mobile coverage and no coils to change! Order Today.

DENTRON ANTENNAS:

SKYMASTER — 10, 15, 20, 40m VERTICAL.
SKYCLAW — TUNEABLE MONO BAND 160-40m EX-1 IDEAL VERTICAL FOR PHASING.

- WRITE OR CALL FOR SPECIFICATIONS.
- **CHECK OUR MOST SENSIBLE PRICES.**

WE ARE AUSTRALIA-WIDE DISTRIBUTORS OF DENTRON PRODUCTS

CHIRNSIDE ELECTRONICS

APPOINTED YAESU DISTRIBUTOR.

DIRECTOR: FRED SWART – VK3NBI For personal attention.

(INTRODUCTORY PRICES ONLY)

YAESU

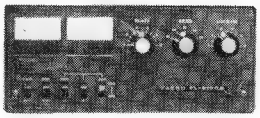
Featuring Yaesu Musen FT–7
Mini Mobile Transceiver as well as ideal Novice Transceiver.
80–10 Metre operation. VFO controlled 20 Watt DC input. Noise blanker and facilities for fixed channel operation.

OUR PRICE: $560

Complete with mic, mobile mount and cables.

FL–2100B
1200 watt Linear Amplifier.
You too can get to the legal limit for only **$548. The FL–2100B operates on 80 thru 10 Meters with dual cooling fan.**

OUR PRICE: $558

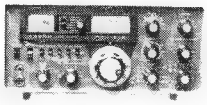


QTR–24
24-hour World Clock. Will tell you the time anywhere in the world at just a glance.

OUR PRICE: $33

FT–101E
Complete AC–DC Transceiver with Built in RF processor. The rig comes complete with mic and cables.
260 PEP SSB, 180 Watt CW, and 80 Watt AM plus lots of other features.

OUR PRICE: $876

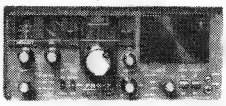


YO–100
Matching monitorscope for FT–101E as well as other equipment

OUR PRICE: $279

FRG–7
General Coverage Communications Receiver from 5 MHz to 30 MHz.
Uses Wadley Loop System (drift cancellation circuit).
Guarantees excellent stability.

OUR PRICE: $338



YP–150
Dummy Load Watt Meter.

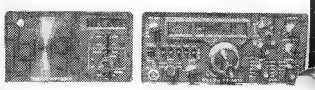
OUR PRICE: **$108**

FT–301D Deluxe digital transceiver.

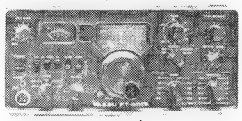
OUR PRICE $1225

FT–301 Fully solid state transceiver 200 watt PEP input.

OUR PRICE: $1039



FT–301S
Ideal Novice Transceiver.
20 watt DC input. All solid state. All modes SSB, CW, AM, and FSK.



OUR PRICE: $749

(Includes AM board and VOX Cal. board).

DON'T BE TRAPPED WITHOUT THESE EXTRAS.

$49

YD-844

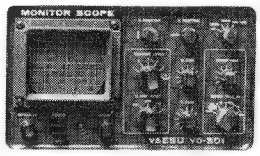
FT–901DM
This rig has absolutely everything.
Just what you always wanted and more.
Ring or write for brochure.

OUR PRICE: $1499

MATCHING POWER SUPPLY
FP–301 – PRICE $179

YO–301
Matching monitorscope for 301 series.

OUR PRICE: $379



Country clients especially welcome. Enquire about our free freight plan on certain items.

DEALER ENQUIRIES WELCOME

All prices include Sales Tax. Freight and Insurance extra.
Prices and specifications are subject to change without notice.

ALL SETS COME WITH ENGLISH INSTRUCTION MANUALS AND SPARE PARTS BACK-UP SERVICE.
90 day limited warranty on all equipment excluding final tubes or semiconductor.

CHIRNSIDE ELECTRONICS. 26 Edwards Road, Lilydale, 3140. Phone: (03) 726 7353. **OPEN ON SATURDAYS TILL 12 NOON**

GILCO

AMATEUR RADIO CENTER

23 WHITING STREET, ARTARMON, NSW 2064

TELEPHONE: (02) 439 1271

KENWOOD

YAESU

hy-gain ANTENNAS

YAESU

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cushcraft

Q.: THINK YOU WERE SUCCESSFUL IN THE LAST EXAM?
Q.: HAVING PROBLEMS TRANSLATING THEORY INTO PRACTICE?
Q.: CONFUSED BY THE CLAIMS OF MANUFACTURERS?

THEN COME AND TALK TO US!

We have a wide range of radio equipment suitable for your operating requirements. We have the know-how to assist you in setting up a new station or updating your existing equipment whether you QTH is: A CITY FLAT — A SUBURBAN HOME — ACRES OF COUNTRY SPACE.

Whatever your lifestyle, you can enjoy ham radio.

SPECIAL — POWER SUPPLIES

138/3	3A	13.8V	Reg. Supply	P.O.A.
138/5	5A	13.8V	Reg. Supply	$55.00
138/10	10A	13.8V	Reg. Supply	P.O.A.
138/20	20A	13.8V	Reg. Supply	P.O.A.

These power supplies are ruggedly designed for Australian conditions. All ratings are continuous. Filtering is through computer grade capacitors.

WE ALSO MANUFACTURE TO YOUR SPECIFICATIONS.

GILCO AMATEUR RADIO CENTER

23 WHITING STREET, ARTARMON, N.S.W. 2064

Prop.: JACK GILLHAM VK2DG

SOCIAL RESPONSIBILITY: We reserve the right to refuse sale of transmitting equipment to unqualified persons.

SIDEBAND ELECTRONICS IMPORTS, P.O. BOX 23, SPRINGWOOD, N.S.W. 2777, Telephone 047-511.394
A.H. 047-541.392

Two years ago, after more than a dozen years of retail selling of amateur equipment, I decided it was time to retire from a seven days a week - 52 weeks a year activity and gave, free of charge, my retail business away while continuing, in a more leisurely manner, to import the same merchandise and sell it on a wholesale basis.

Recent developments, affecting profit margins and other aspects of the business, have made me decide to return to retail sales. Business is invited on my same old basis of cash with orders at the best prices obtainable elsewhere. There is plenty of stock available.

Antenna rotators will be sold only for 28V AC operation to defeat a threatening colossal overhead due to action of the Electricity Authority of N.S.W. There are laws that require all devices, producing what they call Extra-Low Voltage from 240V AC, including rotator control/indicator boxes, to be submitted for approval by the Authority. There is nothing wrong with that; users have to be protected against substandard and sometimes lethal equipment. But the outrageous charges for testing fees, which can be repeated if equipment does not meet some exaggerated standards, can easily be $1,000.- or more for a simple rotator control box. The fee for an appliance plug with moulded cord, for instance, is $510.-!!! For sales of a few dozen rotators of one type, this would increase the cost to the consumer to such a degree that it is better to eliminate the 240V AC supply and feed them with 28V AC from sources easily available in most ham stations.

Sorry, no HY-GAIN antennas available anymore. Hy-GAIN went bankrupt early this year and their factory is closed by the banks there, waiting for a 25 million dollar buyer for the lot! I have had a visit from Mike Staal, manager of KLM ELECTRONICS, makers of famous mono-band beams, and they will soon let me know what they can produce to fill the gap created by the disappearance of HY-GAIN beams from the market.

KENWOOD TS-520S 10-160M SSB/CW transceivers	$650.-
KENWOOD TS-820S 10-160M SSB/CW transceivers w/inbuilt digital readout	$1,000.-
KENWOOD DG-5 digital display unit for TS-520S	$175.-
KENWOOD TR-7400A 2M 25W FM 12V DC transceivers	$400.-
KENWOOD TV-506 6M transverter	$175.-
YAESU MUSEN FRG-7 all band Wadley loop receivers	$300.-
Other Yaesu Musen products on order.	
FDK MULTI-800D PLL 800 channels 2M transceivers in 5KHz steps 12V DC 1-25W adjustable output with digital readout	$325.-
FDK DD-800 bright remote digital display for the 800D for mobile use	$40.-
FDK QUARTZ 16 24 channel 10W 12V DC 2M transceivers with crystals for repeaters 1 to 8 incl. and channels 40 & 50	$175.-
ICOM IC-202 2M SSB portable transceivers - a few left only for	$175.-
KEN KR-400 antenna rotators with 28V AC control/indicator box	$100.-
KEN KR-500 same as KR-400 for vertical plane beam rotation	$125.-
Amphenol type coax connectors, many types: PL-259 large or small, for RG-8U or RG-58U, SO-239 all 75¢ each.	
Right angle and T-connectors $1.50 each.	
ATTENTION NOVICE LICENCEES: 24 channels 5KHz apart, 28.480 to 28.595 AM/USB transceivers, 10W PEP with clarifier on receive and transmit, virtually continuous coverage of the 10M DX band portion 12V DC	$150.-

The above prices are on a cash with order basis, subject to change without prior notice; remember our dollar's value is going down almost by the week, now only worth 60% of what it was 3½ years ago against the Japanese Yen on the Tokyo market!!! Airfreight, rail- or road-transport charges are extra, full risk insurance is free.

Arie Bles, VK2AVA, proprietor
Roy Lopez, VK2BRL, manager

THE MAN BEHIND THE MICROPHONE

As the front cover shows, Jim Davis VK7NOW, has one of the best looking amateur stations in Australia. The equipment line-up includes Kenwood TS520S, Yaesu FT101E, FT200, FT75B, Icom IC22A, six antennas, including an 80m inverted V and a triband HF beam. Any of five HF antennas can be selected by coaxial switch.

Jim, 65 and now retired (?), was first interested in radio in the 1920s but only took up the hobby seriously four years ago. He has fitted the shack with acoustic tiles on the ceiling, air-conditioning in the wall and carpet on the floor. Both cassette and open reel tape record/playback facilities are available for any QSO. A 60 watt hi fi amplifier with two five cubic ft enclosures is used for better audio when warranted.

Not only does the equipment look attractive, it is used efficiently by the owner. Jim was the top Novice scorer in the phone section of the 1977 RD contest. This was his first attempt so watch out this year!

Jim is an enthusiastic exponent of the use and virtues of RF clipping, especially for the QRP operator.

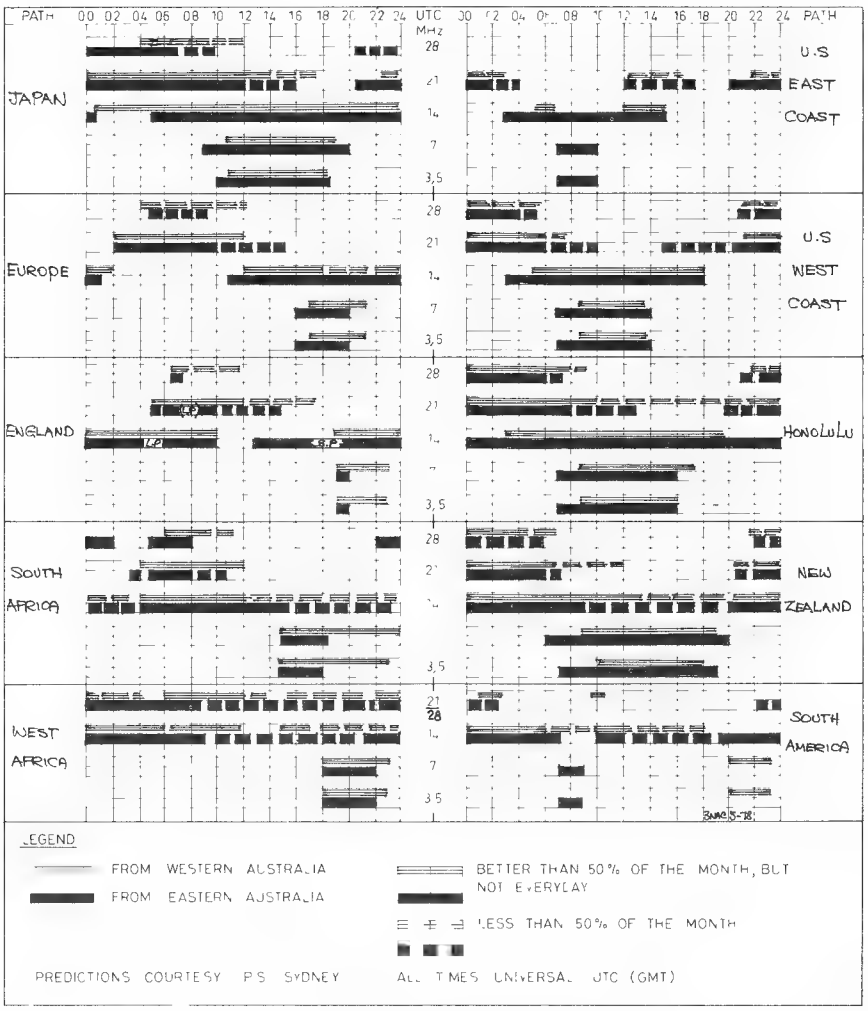
An October issue of "The Advocate" carried an article by Burnie journalist and CB operator Mike Lawson. This described a visit to Jim's shack and gave a fine explanation of amateur radio and where and how to get a licence. A considerable volume of CBers have seen Jim in action at the console and a dozen are reported to be so impressed that they are now studying for their Novice licence.

What next? Well the console is being enlarged to accommodate a new Robot 400 scan converter and sundry SSTV gear. Give Jim a call and find out what else is in that expanding console.

Short contributions with a photograph are invited for this segment.—Ed. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC



RAOTC DINNER 1978

Bob Cunningham VK3ML

The Radio Amateur Old Timers' Club of Australia has now reached a membership of 200. In addition to VK members the club enjoys membership from USA, Great Britain and Holland, etc.

The Annual Dinner of the club was staged at the Sciences Club, Clunies Ross House, 191 Royal Parade, Parkville, Melbourne, on Thursday, 9th March. A record number of members turned up for this function, amounting to just on 100. In the chair was Dr. Bill Butement VK3AD. It was very pleasing to note those attending, including quite a number of VK2 members, in addition to an amateur from the Netherlands PA0ALO.

The Master of Ceremonies for the evening was Max Hull VK3ZS, who carried out his duties in a truly professional fashion, and was able to keep the function going at a high level of activity.

Letters were read conveying wishes for the success of the dinner from a similar Old Timers' Club in the Netherlands and from the Old Timers' Club of New Zealand. The guest speaker for the evening was Bill Jenvy VK2ZO, a retired official from the Overseas Telecommunications Commission. It was Bill's father, Walter Jenvy, who was Chief Electrical Engineer to the Victorian Post Office in 1901, and who was at that time operating his own experimental wireless station at Red Bluff, near Elwood, under the call sign of BJ. Walter was requested by the Victorian Government to establish the Station at Queenscliff for the purpose of transmitting a welcoming message to the then Duke of York on board the s.s. "Ophir" as it approached and entered Port Phillip Bay. The Melbourne "Argus" newspaper published a report on April 11th, 1901, on the feasibility tests carried out by Walter Jenvy prior to the actual event. As it finally transpired s.s. "Ophir" did not carry a wireless but the escort cruiser H.M.S. "St. George" did and two-way communication with Queenscliff and later Red Bluff was carried out over a distance of up to 30 miles.

To support his remarks, Bill Jenvy arranged with the Sciences Museum in Melbourne to make available the Morse Code transcriptions as they occurred on this occasion, together with a coherer as parts of the equipment used in those days. We are indebted to the Museum for this loan.

Later in the evening PA0ALO was asked to address the members in which he included an invitation to any member visiting the Netherlands to contact their kindred association for hospitality which he felt sure would be warmly provided.

At the conclusion of the dinner, it was moved by Bob Anderson VK3WY that the current President and Committee be re-elected for the coming year. The President, Bill Butement, wished to nominate Bob Cunningham VK3ML as a Patron to the club in recognition of his services in being the founder of the ROATC. Both these motions were carried with acclamation.

It is anticipated that the Sixth Annual Dinner will be held in the same location at about the same time in 1979. All members were requested to make every endeavour to increase the membership of the club, which is open to any amateur in any part of the world who has held an Amateur Operator's Licence for 25 years. The Membership Secretary of ROATC is Harry Cliff VK3HC, whose address is Box 50, Point Lonsdale, Victoria. ■

QSP

Applications are now being received from **responsible** CBers living within the Maroondah district.

All applicants will be screened through Police Headquarters and a yearly subscription of $15 will be payable on acceptance into PACER. Insurance cover is included in the subscription.

APPLICATION FORMS ARE NOW AVAILABLE AT THE ENQUIRIES DESK AT POLICE DISTRICT HEADQUARTERS IN NUNAWADING (OPEN 24 HOURS).

Applicants should be a minimum age of 21.

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52 450
	VK2WI, Sydney	144 010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.440
	VK3RTT, Mt. Mowbullan	144 400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mount Lofty	53.00
	VK5VF Mount Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52 950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145 000
VK7	VK7RNT, Launceston	52 400
	VK7RTX, Ulverstone *	144.900
	VK7RTW, Ulverstone *	432 475
VK8	VK8VF, Darwin	52 200
JA	JA2IGY, Nagoya	52.500
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii †	50.110
ZL1	ZL1VHF, Auckland	145 100
	ZL1VHW, Waikato	145 150
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52 500
	ZL2VHF, Wellington	145 200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

* Re-entered on listing.
† Note frequency change.

Tony VK7AX writes to confirm the installation and operation of the new VK7 beacons on 144 900 and 432.475 MHz from Ulverstone, and these are listed herewith. As reported last month, David VK5KK had already reported hearing these beacons on 28/2 so now we have the final confirmation.

Also noted in the beacon listings this month is a change to the frequency of operation of KH6EQI to 50.110 — the operator of this beacon listens from time to time on 50.104 — if you are hearing this beacon listen carefully and you will find at times the call changes from VVV de KH6EQI to CQ CQ CQ de KH6EQI — that's the time to give a call on 50.104 MHz! Of course you VK readers wouldn't do that, would you?

VHF DX FROM DARWIN

Graham VK8GB has forwarded three letters full of interesting information this month, and the following extracts will be of interest to you.

Graham has sent me a copy of the QSL received from Tell JH6TEW for the first VK-JA 144 MHz contact on 24-2-78 (reported last month) and Tell runs 20 watts input from a TS700G2 to a pair of 10 element crossed yagis 15m high. He is 15 years old, so what a thrill for such a young operator.

Now let us have a look at what March produced for Graham.

"Saturday, 4-3-78: 0507Z KH6HI 5 x 6 to 5 x 9 +20, 50.103 to 52.103 split frequency working. 1118Z to 1355Z: JA1, 2, 3, 4, 5, 6, 9 and 0 for 19 stations worked. Also 1145 to 1415Z worked KG6JIH, KG6JDX and KG6DX. At 1228Z worked JH3TEW on 144.110 at 4 x 1/5 x 2. The KH6 opening was for about an hour. KH6IIA was also heard and the beacon KH6EQI was 30 dB over 9 at times. I also heard the KH6s working VK4MS, VK4RO, VK4TL and VK8VV. The guys in KG6 worked into VK4 and VK6ZFQ in the evening for the first time. P29 was worked in Japan in the evening as was VK6 and VK4.

"Sunday, 5-3-78: 1200 to 1343Z to JA only on 6 metres, 26 stations worked from JA1 to 6 inclusive plus JA9. No signals on 2 metres.

"Monday, 6-3-78: 1028 to 1415Z six metres worked JA1 to 7 plus JA9 with 43 contacts altogether. 1250 to 1415Z worked KG6JIH, KG6JDX and KG6DX, all 5 x 9. The six metre openings were widespread, JA to VK4, VK6, VK8, P29, KG6 to the same areas. On 144.110 at 1054Z worked JH4OOK 4 x 3/4 x 1; 1115Z JR6BVG 5 x 8/5 x 9; and 1145Z JH6SFL 5 x 5/5 x 5.

"Tuesday, 7-3-78: 1035 to 1337Z on 6 metres worked 21 stations in JA1, JA2, JA4, JA5 and JH6 areas. 1322 to 1342Z worked KG6JIH, KG6DX. On 144.110 at 1142Z worked JH6TEW 5 x 1/5 x 1; 1151 JR6AYU 5 x 3/5 x 3; 1159 worked JH6PWK 5 x 3/5 x 3. Again a very widespread six metre opening. JA to P29, VK4, VK6 and VK8. KG6 to VK4, VK6 and VK8.

"Wednesday, 8-3-78: I was QRT for most of the evening but Brian VK8VV worked the following on 2 metres: JA4HI, JH4SOY, JH4EPN, JH4FBI, JH4XTN, JR6GRP, JH6TGD, JR6BEN. Signals were up to S7. On six metres 1230Z worked JA2BZY, JA1RJU, JH6TEW, KG6JIH, KG6 JDX and KG6DX. At 1233Z HL9WI broke into the group and both Brian VK8VV and myself worked him. He is now listening nightly for us on 2 metres! 1335Z JA3ETI, 1339 JA2FOX and 1342Z JH4XJI on six metres. JAs worked VK2, 3, 4, 6 and 8 and P29 today on 6 metres.

"Thursday, 9-3-78: 1210Z to 1311Z on 6 metres worked JH6TEW, JA3ETI, JG1VCZ and JR1AUW. On 144.110 at 1218 worked JA6CL 5 x 3/4 x 1; at 1225 worked JH6IFF 5 x 4/5 x 1. Brian was QRT this night until 1440Z when he worked KG6JIH on 6 at 5 x 9+.

"Friday, 10-3-78: Brian VK8VV worked Cliff KH6JSI 0500 to 0530Z with 5 x 9+ signals. I worked Cliff on CW at 0535 but signals were fading and very scratchy. Cliff worked 3D2CM on six on 9-3-78 which confirms activity in Fiji. On six metres 1120 to 1255Z worked JA2, JA3, JA4 and JH6 for 7 contacts. On 144.110 at 1148Z worked JA6QFH 5 x 5/5 x 2; and worked him again at 1220Z 4 x 1/4 x 1. JAs worked VK4s at 0520Z on six metres.

"Saturday, 11-3-78: I was QRT until 1240Z. Brian VK8VV worked 16 JAs on two metres between 1100 and 1216Z. 5 x 9 reports were common, call areas JA4 and JA6 only. At 1240Z I worked KG6JIH, KG6JDX and KG6DX all at 5 x 9. Joe KG6JDX runs about 200 watts on 2 metres and is desperately looking for contacts! Gerry KG6JIH reported solar flux figures as follows: 9-3-78 186; 10-3-78 180. These are very high.

"Sunday, 12-3-78: At 1033Z JAs contacted on six metres. QSY to 2 metres at 1050Z, at 1100Z JAs broke VK8VV and myself with a 5 x 9 dogpile! Brian worked 13 stations on 2 metres and I worked 22 stations in the JA4, JA5 and JA6 call areas between 1100 and 1208Z, signals 5 x 9 both ways! I am not using my linear as it has a bit of insertion loss on receive, is a bit inconvenient to operate and all the JAs run 20 watts PEP anyway. My equipment for all these contacts has simply been FT101E, FTV250 transverter, 10 el. yagi. On six metres after the 2 metres episode worked JA1 to 4, JA6 and JA9 for 15 contacts, 1300Z worked G6JIH, KG6JDX and KG6DX. At 1320Z worked Richie VK4RR at Mackay on backscatter 5 x 3/4 x 1. The JAs were working as far south as Rockhampton in the evening and the KG6s worked many VK4s. There was a brief afternoon opening to VK4AO too.

"Monday, 13-3-78: 1100Z KG6JIH; 1150Z JH6TEW; 1155Z VK4IK/KG6; 1158Z KG6JDX. A quiet day

"Tuesday, 14-3-78: Again on six metres, 1155Z JH6TEW and at 1220Z JA2BEY . . . and now the scenario pauses for a lunch break until . . .

"Friday, 17-3-78: On six metres 1105 to 1300Z 12 contacts to JA1, 2, 3, 4 and 6.

"Saturday, 18-3-78: Six metres 1945 to 1340Z JA1, 2, 3, 4, 6, 7, 9, 0, plus HL9WI and KG6DX, for a total of 24 stations. On 144.110 between 1125 and 1137Z JH6PWK 5 x 4, JA6DZ 5 x 2, JA4BCW 5 x 4, JH3BZK 5 x 6, JR6DQO 5 x 1, JH6TEW 5 x 2 and JR3GHI 5 x 3.

"Sunday, 19-3-78: 0325 to 0354Z KH6EQI 5 x 9, KH6HI 5 x 9, KH6JSI 5 x 8, KH3IJ 5 x 7 and KH6IAA 5 x 7. Between 1127 and 1353 worked 24 JAs and KG6 in the call areas JA1 to 7 plus JA9 and JA0. All these on six metres. Between 1206 and 1232Z worked JH6ETS, JH4DOR, JHNTEW, JH6AWT, JR6ODU and JA6QFH on two metres.

"Monday, 20-3-78: 1252 to 1259Z JH6TEW, JA1RJU and KG6JDX on six metres. On two metres worked a total of 30 stations in the call areas of JA4, JA6, JH6 and JR6. JH6GEU: I gave him 5 x 9 + 15, he gave me 5 x 9 + 20 dB!

"Wednesday, 22-3-78: 1020 to 1245Z four JA stations plus KG6JIH. Quiet day!

"Thursday, 23-3-78: JA1, 2, 4, 5, 6 plus KG6JIH for 12 stations on six metres. On 144.110 between 1149 and 1321Z worked 27 stations in the call areas JA4, JH4, JA5, JA6, JH6 and JR6. JA5UXF was operating /6 so it is not really any change in call areas from 4 and 6 as previously worked.

"Friday, 24-3-78: On six metres between 0400 and 0420Z worked WA8GUB/KH6 and KH6JSI. Between 1021 and 1420Z worked 29 stations in JA1 to 6, JA0, KG6JIH and KG6DX. On 2 metres between 1037 and 1224Z worked a total of 43 stations in the Japanese 4 and 6 call areas (makes your mouth water . . . 5LP).

"Saturday 25-3-78: On six metres between 0945 and 1300Z worked 12 JAs in call areas 1, 3, 4, 5, 6 and 7 plus HL9WI and KG7DX. On 2 metres between 1110 and 1224Z worked a total of 34 stations again the call areas of JA4 and JA6.

"Sunday, 26-3-78: Quiet day, worked KH6JSI at 0313Z!

"Monday, 27-3-78: On six metres 0400 to 0550Z worked WA8GUB/KH6, KH6IAA and KH6IJ. From 0952 to 1050Z worked JA6TEW, JA6DZ, JA1WUD and HL9WI. As you can see, conditions in Darwin have been good but no new countries on six and no new call areas on two metres. Signals on two have peaked to S9+ at times both ways and signals from JA on six metres have been to S9+ 30 dB."

And that's where the "diary" ends for the moment. It reads almost like a book. I have included quite a lot of detail, particularly for the two metre contacts because some people will scrutinize the times and call areas closely to try and obtain some answers to the questions obviously posed — how many times in the past have such contacts been missed for want of someone to be on 144 MHz? Why only two call areas on 2 metres? What form of propagation is making the contacts possible? Why are the signals not being heard in Guam? Are they limited to a strict north-south path with a definite cut-off distance? Are they dependent on six metres being open as well? etc. etc.

Graham also includes a number of "extracts" from his log book in which readers will be interested.

"On 1-3-78 XE1GE heard New Zealand TV on 50.750 2115 to 2245Z. On 3-3-78 JA worked KH6IIA, KH6HI and KH6IJ 0410 to 0545Z. KH6 worked Chile and Argentina. JA5CMO worked CE3OK 0300Z. JA worked VK4RO 0300Z.

"On 4-3-78 JA heard KH3EQI weakly, JA worked VK4RO 0500 to 0700Z. On 25-2-78 the W6JRA beacon was heard in Japan in JA3 area. KG6DX reports 3D3CM active on six. KG6JDX runs 250 watts SSB on 2 metres now. On 5-3-78 VK8VV and VK8GB both heard the KH6EQI beacon at 10 dB over 9. 13-3-78, JAs working VK4MS and P29HV, KG6 only hearing VK8. 14-3-78, 3D2CM worked JA 0900Z.

"16-3-78: Chatted with Al KH6IAA on 10 metres and he passed on the following information: Opening on six metres KH6 to LU on 15-3-78. He works 3D2CM nightly. KH6IAA is located on Hilo Island and runs a TS520 to a FTV650 using an outboard power supply. No VK8VF beacon heard in JA today, but JA2BZY reported VK4YV at 1159Z, and VK4RO, VK4GS and VK4LX at 0830Z.

"17-3-78: UAONLU and RAOLFI in Vladivostok operate on 2 metres and are looking for VKs on 144.110 at 1130Z. 18-3-78: KG6DX worked VS6BE in Hong Kong on 14-3 on 52.025 on SSB. VS6BE Lyell advised he had his Henry 6N2 going and says from April he will have 52.025 CW only and 52.100 SSB only. KG6DX worked P29ZWW and VK4RO this day — KG6 to VK4 is quite common nowadays.

"19-3-78: KH6JSI worked LU7FA and LU3HFU this day. Opening to VK included VK8GB, VK8VV and VK4RO, the latter being audible in Darwin on backscatter but too weak to copy. KG6JIH is

hearing TVQO and ZL TV regularly. FO8DR will be QRT for six months from 22-3-78. JAs working K9PNT/DU2 on six this evening but I couldn't hear him on 50.175. 20-3-78: KG6JDX reports that P29HV is hearing JAs on two metres but very weakly. KG6JIH heard TVQO at 0000Z today (very early). JAs worked 3D2CM again today. Active stations on six metres in Hawaii are KH6HI, KH6JSI, KH6IAA, KH6IJ, KH6BZF and WA8GUS/KH6.

22-3-78: JAs hearing P29ZWW, VK4GS and VK4RO in the evening. VK4RO to KH6IAA at 0845Z. KG6JIH working JAs at 1000Z. Gerry KG6JIH reported that his latest HR report predicts a sunspot peak of 153 in February 1980 (i.e. smoothed number) and that this cycle looks like being as good as cycle 18. Prediction for February 1978 was 64.4 but turned out to be 90! Joe KG6DX reports that sunsppot counts of 170 relate to an F2 opening to 50 MHz and 180 to an F2 opening on 52 Hz. With a smoothed number of 153 we can expepct MANY days of MUF above 52 MHz. Gerry KG6JIH says the furthest south he has worked is to VK4ZNC near Brisbane.

"23-3-78: JAs contact 3D2CM at 0645Z. KHJIH to P29HV at S9+. Okinawa JR6 to KG6JIH.

"24-3-78: WA8GUB/KH6, Myron, runs an FT620 to a Ringo antenna and sometimes uses a KLM 80 watt linear. Location 25 miles north of Honolulu. KH6JSI works KH7IAA on backscatter. JS1 is on Oahu and 1AA on Hilo about 200 miles away. VK1RK worked six JAs on six metres on 19-3-78. JAs working P29ZWW and VK4DO at 1020Z, also VK4MS. KG6JIH works VK4ALM, also reports hearing TVQO at 0500Z. Beacon WA6JRA is on 50.091 but operation is not 24 hours, also 6Y5 Jamaica beacon is on 50.050 MHz (ex-KG6DX).

"25-3-78: KH6HI works KG6JIH 5 x 7 at 0545Z. KG6 hears TV 'sync' signals on 50.7 from the south-east, maybe Russia/China on backscatter, but might be something else! JAs heard weakly in P29 on 20-3 and 24-3 on 2 metres. KH6HI working LU (Argentina) on 23-3.

26-3-78: KH6s work PY2CSS and PY5WBR on six 0230 to 0341Z. PY2CSS QTH is Sao Paulo and PY5WBR 400 km away. KH6s work VK4MS and VK4RO.

"27-3-78: KH6s worked LU on six days during March! Beacon TI2NA in Costa Rica is on 50.080. Heard VK4RO calling KH6 on backscatter to 5 x 5 on CW and SSB. WA8GUB/KH6 works VK4TL on 52.110 at 0430Z. HL9WI hearing signals on 2 metres.

It's been quite an interesting week. I think conditions are changing. We will probably have to wait about six weeks for USA contacts because I think an Es hop between KH6 and the mainland is necessary."

Graham reports generally conditions have been very good (I would regard that as an understatement . . . 5LP) and they are looking to W for contacts, but no one seems to have any knowledge of beacons there. Graham also remarked that if I was in Darwin during March he could assure me of contacts to JA on six metres AND two metres, plus a long chat to KG6 — currently the paths are more reliable than HF!

On behalf of the VHF faternity I feel we owe a vote of thanks to Graham for taking the trouble to keep us in the south informed of VHF activity in the north. Even if we are not working the exotic stations at least it keeps the more interested and reliable stations in the south on the air and looking to the north — I never ever previously really thought seriously about two metre contacts to Darwin or further north — I do now and so do others! It may take time, but I now firmly believe Darwin at least will be worked from VK5 on 2 metres in due course! Again, many thanks, Graham, for a job well done.

Nev VK4ZNC advises working JAs on six metres almost every afternoon since mid-February to time of writing, 15-3-78, working all areas except JA6, and only one JA5. On 12-3-78 at 1208Z he worked KG6JDX and KG6JIH in Guam on 52.103 after the band had been open to JA most of the afternoon. Signals were 5 x 5. The two Guam stations run about 1 Kw and Nev 400 watts PEP from a pair of 4CX250Bs driven from his FT650 transverter. North Queensland boys were also working Guam at the same time with stronger signals. Thanks for writing, Nev, you have probably worked KH6 by now!

A letter also comes from Rod VK4ZRQ outlining activities in the Brisbane area, and has worked JAs on six metres on 19-2, 25-2, 26-2, 1-3, 3-3, 4-3, 7-3, 8-3, 10-3, 12-3 and 14-3. Interesting to note the rare JA8s were worked on 7-3 and 8-3, and 12-3. On 12-3 0400 to1200Z all JA areas, being the first Class 2 TEP heard. On 14-3 0330 to 1100Z all areas again but with Class 1 TEP (i.e. no flutter, doppler shift, etc.). Also no KG6s! Some good QSOs have been made using only 200 mW.

Rod reports two metres is not being overlooked and confirms the contact with VK3AUR on 13-11-77 at 1200Z on 144.1 SSB 5 x 2 both ways. On 15-1-78 1000Z heard VK3AWD? 144.1, also the VK3RTG beacon. On 16-1-78 he worked VK8ZGF in Alice Springs (reported previously) and on 22-1-78 0630Z VK4ZSH "partially" worked P29ZWW over a distance of 1300 miles on Ch. 40 FM. Rod is also interested in 6 and 2 metre meteor scatter? Any takers? It appears also that FK8AB is on 6 metres with an IC502 to a pair of 6146s. Thanks, Rod.

Included with Rod's letter was a copy of a letter from Ray K5ZMS of SMIRK, and there are a few interesting bits of information in there.

"WB5VWW worked Geoff XE1GE on backscatter on 28-278. Geoff had previously worked LU, PY and ZP9 on 24-2 so was on the alert. The contact with WB5VWW was around 2145Z, and XE1GE heard the KH6EQI beacon at the same time. At the same time he had to sit there for an hour and a half listening to ZL TV audio on 50.750!

"KH6IAA on 2-3-78 worked six LU stations plus a CE, followed by JAs. On 3-3-78 he copied ZL and VK TV and VK beacons from 0500 to 0700Z but no contacts. The northern hemisphere stations are predicting that with the solar flux rising so well conditions may soon rival those of 20 years ago!"

To change the area somewhat, Ken VK6ZFQ writes from Koolan Island, which is 80 miles due north of Derby and just off the mainland. The letter is dated 19-3-78 and reports on that day Ken had just finished listening to the KH6EQI beacon at S3, but no contacts eventuated. From 26-2 until 19-3 Ken worked more than 170 JAs plus KG6JIH, KG6DX and KG6JDX. On some days many JAs are there but he doesn't bother to work them!

Ken has 2 metres SSB but to date has not heard any JA signals. Ch. 2 TV from Perth is an occasional customer, but last October they were able to watch TV RI from Jakarta every night in colour from station open to close using only a 2 element antenna. No results have come from trying to work YB on 2 metres, however. To keep 144 SSB going Ken works daily to VK6FM 80 miles away over rough country, also to Keith VK6KC 60 miles distant. Ken's gear consists of FT620 into a 3 element yagi for 6 metres. Two metres a home brew solid state transverter with 25W PEP drive via the FT620 into a 5 el. yagi. 2 metres FM: Philips 1680 25 watts 146.000 also repeaters 2, 4, 6 and 8. On 432 MHz he uses the FT101B to drive a Modular Electronics transverter with 10 watts PEP into a 4 element yagi.

Ken advises he is in an ideal location with YB (Indonesia), an all water path. The TV station he runs is CKR7, located on the highest spot on the island, 670 feet a.s.l. The ocean is only three-quarters of a mile away, giving splendid ocean views. They have a 110 foot tower for the TV station, so Ken makes use of that to mount some of his own antennae! Thanks for writing.

Geoff VK3AMK writes confirming much of the information already included from Graham VK8GB. However, he has some interesting news on JH6TEW, the first JA to work VK8GB. Geoff reports that Tell is a 15-year-old high school student, both father and mother are amateurs, his 13-year-old brother works 6 metres and his 11-year-old sister is sitting for the exam in May! Tell's English is excellent and says he is now learning Spanish so he can work South Americans! Tell is now very keen to work a VK5 to clinch the world record 2 metre contact — that's good news . . . 5LP.

Tell also passed on to Geoff information regarding a DXpedition on 29-4 to 3-3 to VS6 and CR9, operation on 15, 10 and 6 metres. VS6 on 50.110 and CR9AJ on 50.200, but will QSY to 52 for VKs! So we will wait news of what contacts were made.

Steve VK3OT sent a copy of a letter received from Dave W9CGI, who indicates many operators in USA are completely unaware that VK allocation is 2 MHz higher on six metres than they operate. W9CGI uses a TR-6 giving 180 watts of SSB and 240 watts CW, giving him 47 US States and has heard the KH6EQI beacon strongly. He has ordered extra crystals to give him 52.000 to 52.500 capability and will pass the word around via "73" of our 2 MHz disability.

Of course it is the old story — we do have a 2 MHz disability offset from the rest of the active 6 metre world, and it extends beyond purely the band offset. For those in the north to work us they need to tune higher in frequency which means their otherwise good antennae drop off seriously in performance to a fraction of what is usual, with a high SWR. We are not quite so badly situated for antenna performance as we operate lower in frequency to listen and, as you all know, the yagi antenna drops off in performance at a slower rate on the low frequency side of resonance than the high side. But my own normally very efficient 3 element wide spaced yagi on 52 MHz loses some 6 to 8 dB of gain by tuning down 2 MHz so signals need to be that much stronger before contacts are possible. We can only hope the work Graham VK8GB in Darwin is doing will continue to alert more stations overseas of our problems and give a chance for those overseas to get extra crystals installed.

Just to change the subject a bit I was appalled to read in the Moonbounce Report for March 1978 in "The Propagator" of the serious damage done to the Dapto EME installations. Damage was first discovered on 8-2-78, buildings had been entered, windows smashed and items in all rooms either smashed or stolen. Fire extinguishers had been discharged over equipment, paint thrown around and cupboards emptied. Holes smashed in the floor and a fire had been lit in one room, but fortunately had not caught the building alight. The padlock had been jemmied off the steel security locker which houses the EME equipment, and items of gear either stolen or damaged. Quantities of wiring and cabling had been ripped out.

Temporary repairs were attempted to try and get on the air to meet their obligations to stations overseas on 11-2 but to no avail. A week later the buildings were again entered and even more serious damage resulted from the intrusion. Under circumstances no further repairs were attempted.

On 2-3-78 an inspection was made with representatives from the University and it was decided security could no longer be offered at the present site, so after eight years the Dapto Moonbounce Project, as such, had been destroyed. So now a practicability study is being undertaken to see if the 30 foot dish can be moved to a safer site.

I feel sure those who care will join me in expressing disgust as well as disappointment that there are individuals who will stoop to such depths of destruction, and the consequent heartbreak it causes to those who have been so dedicated to the project. May we wish you, Lyle VK2AUU and Charlie VK2ZEN, the mainstays of the project, the hope that the project can be undertaken elsewhere in the future, under safer conditions. In the meantime, we all say thank you for a task well done, and the opportunities you have provided for overseas stations to work VK on 432 MHz EME — without your efforts this would not have been possible — may be some small reward for your efforts. We salute you and your helping group.

Before finishing up for this month, 144 MHz across the southern climes still provides interesting contacts. VK6 at Albany to VK5 pops up every now and again, as also does 432 MHz. On 5-3-78 Col VK5RO and myself VK5LP observed at 1430Z whilst beaming to Albany in the west, backscatter signals from VK3YII. To check, I turned the beam to the direct path but no sign of the VK3. Going back to the west and he was there again. Col remarked he had always been of the opinion that

backscatter was possible on 2 metres but very few if any people believed him. However, this time he was very pleased to have my confirmation of the phenomenon. After a period VK3YII did become audible very weakly on the direct path.

A brief opening between JA and VK5 on 27-3 at 0315Z. VK5ZZZ worked JE1, JH7 and JA8 for about 10 minutes with signals to 5 x 9. That's a fairly opening to JA from this area.

The notes have contained a lot of interesting information during the past few months, thanks to my very good correspondents. I wonder how much longer it will go on. Is this just a taste of things to come with the solar count increasing significantly? I would like to think so. The March/April period could bring some surprises, perhaps I can report them to you next month.

In the meantime, let us close with the thought for the month: "If we really want to stop organized crime, all we have to do is form a government department to run it, then stand back while it is choked to death by red tape!"

The Voice in the Hills. ■

AMATEUR SATELLITES

Bob Arnold

VK3ZBB

Another milestone in satellite history has been passed with the successful launching of AMSAT OSCAR D which became known as AO8 once it became operational. Launch was precisely at the predicted time of 1754Z on the 5th March and ejection from the launch vehicle took place one hour twenty-five minutes after lift-off. Several enthusiasts in Australia listened to the launch which was broadcast on the 20 metre band and although reception was poor, sufficient intelligence was received to indicate that things were going well, and we had the great thrill of hearing the Mode J beacon as the satellite passed over Melbourne on its second orbit.

Since that time many orbits have been logged, sufficient to give reasonably accurate parameters for local times of acquisition. The satellite became stable much more quickly than was anticipated and before the end of the first day the ten metre antenna was deployed making it possible to re-receive the Mode A beacon on subsequent passes. The satellite was taken over by ARRL on the 20th March and we understand the Mode of operation will now be scheduled for Mode A on Mondays to Fridays inclusive and Mode J on Saturdays and Sundays.

The orbital parameters of AO8 are quite close to those predicted, the most recent being orbit time 103.299 minutes, incremental shift per orbit 25.8075° West.

The calendar of first equatorial crossings given at the end of these notes is as accurate as can be expected at this early stage, and a tolerance of a minute or so may be necessary. It has been ascertained that the times of acquisition in Melbourne are similar to the times for OSCAR 7, i.e. to the equatorial crossing time add the time of the appropriate number of orbits (four, five or six) multiplied by 103 minutes and again add approximately 92 minutes for S-N pases and 60 minutes for N-S passes.

To acknowledge the indebtedness of Australian amateurs to the small band of AMSAT volunteers connected with the launch of AO8, I have sent the following letter to Joe Kasser, Editor of AMSAT Newsletter:—

On behalf of Australian amateurs, congratulations to the team who so ably constructed AO8 and arranged for its launch.

We were all most impressed with the timing of the operation and were thrilled to hear the 435.095 beacon as AO8 came over Australia on its second orbit at 0601 local time. Subsequently, at least one of our enthusiastic group has heard the Mode A or Mode J. beacon on most passes in sight of Australia and in the last few days communications have commenced through the satellite.

Communications on Mode A are better than through OSCAR 7 and we are looking forward to the Easter period when we shall have the first opportunity to work on Mode J.

Again, congratulations to all concerned for a job well done; they deserve every encouragement from amateurs in the Southern Hemisphere.

Joe Kasser G3ZCZ, together with Perry Klein W3PK, published a considerable amount of information on AO8 in the AMSAT Newsletter. This has been edited and is reproduced for the information of local enthusiasts. You will appreciate that with the launch having been effected, reference to OSCAR D should now read AO8.

INTRODUCTION

AO8 was built over the last two years by radio amateurs in the United States, Canada, West Germany and Japan, and is also the first spacecraft in which AMSAT, Project OSCAR and the ARRL have joined together in building flight hardware.

AMSAT-OSCAR D carries transponders for two modes of operation. There is a conventional 145.9 MHz/29.4 MHz Mode A transponder, and a new 145.9 MHz/435.1 MHz Mode J transponder, a similar frequency combination that was pioneered by the OSCAR IV spacecraft in 1966. Six channels of telemetry are provided to monitor the onboard status of the spacecraft. The spacecraft makes extensive use of parts left over from the AMSAT-OSCAR 7 and Phase III programme.

MISSION OBJECTIVES

The principal objective of the AMSAT-OSCAR D spacecraft is the educational uses of a low orbiting satellite. It is to provide a means for the use of such a satellite as an educational tool in schools or other educational institutions. Other objectives include the continuation of communications demonstrations by means of stations in the amateur-satellite service, of the feasibility of using satellites with small amateur terminals of "bush" communication, emergency communications, communication between medical centres and isolated areas, aeronautical, maritime and land mobile communications, direct satellite-to-home voice "broadcasting" to simple amateur receivers, and other similar applications. Further objectives are to demonstrate special operating techniques that enhance the usefulness of low orbits for these satellite applications, and to test the suitability of a new communications transponder frequency combination (Mode J) for small terminal users.

AMSAT-OSCAR D will permit the continuation of the education programme, which began with AMSAT-OSCAR 5, 6 and 7, over the next several years, the AMSAT-OSCAR D anticipated lifetime. OSCAR satellites have begun to play an important role in a new approach to science education. Used as remote laboratory tools, these satellites represent a pioneering utilization of an active space system in the classroom. Since the launch of the first satellites twenty years ago, satellites have had a very dramatic impact on education. Using inexpensive ground terminals for OSCAR satellites in schools, students can gain first-hand experience in space science. This type of direct, active involvement has relevance to the study of communications, astronomy, engineering, physics, mathematics and meteorology. The OSCAR ground terminal puts at the disposal of the instructor and student an active satellite system as a resource for demonstration and experimentation.

SPACECRAFT DESCRIPTION

AMSAT-OSCAR D is a communications satellite in the AMSAT Phase II (low-orbit) series, designed to operate with small stations in the amateur-satellite service on a non-commercial basis. The spacecraft contains two communications transponders and command and telemetry systems. The spacecraft is solar powered, weighs 60 pounds, and is a 15-inch rectangular solid 13 inches high. Its anticipated useful operating lifetime is three years.

Two types of communications transponders are aboard the spacecraft. Normally, only one transponder will be operated at a time because of spacecraft battery constraints.

TWO-TO-TEN TRANSPONDER — "MODE A"

Note: Bold letters are inferior letters.

The Mode A transponder is a two-to-ten metre unit similar to the one on AMSAT-OSCAR 7 and with the same frequency passband (input frequency passband of the 145.85-145.9 MHz, and output frequency passband between 29.40 and 29.50 MHz). A 250 mW telemetry beacon provides telemetry data in Morse code at a frequency of 29.402 MHz. Approximately —95 dBm is required at the transponder input terminals for an output of one watt. This corresponds to an effective radiated power from the ground of 80 watts for a distance to the satellite of 1,200 miles and a polarization mismatch of 3 dB. The transponder translation frequency (input frequency minus output frequency) is 116.458 MHz. Thus, the relationship between the upling (**fu**) and downlink (**fd**) is as follows:

$$\mathbf{fd} = \mathbf{fu} - 116.458 \pm \text{Doppler}$$

where both **fd** and **fu** are in MHz.

(For example, an uplink signal at 145.900 MHz will produce a downlink signal from the transponder on 29.442 MHz ± Doppler.) As in the two-to-ten metre transponders in AMSAT-OSCARS 6 and 7, the passband is **not** inverted, and upper-sideband uplink signals become upper-sideband downlink signals. Output power is 1 to 2 watts.

Note that the downlink frequency will be slightly different (8 kHz) to that of the equivalent AMSAT-OSCAR 7 Mode A transponder that has an equivalent frequency relationship of

$$\mathbf{fd} = \mathbf{fu} - 116.450 \pm \text{Doppler}.$$

TWO-METRE TO 70CM TRANSPONDER — "MODE J"

The second transponder, constructed by members of the Japan AMSAT Association in Tokyo, uses a two-metre input, 70 centimetre output combination which has not yet been flown in the AMSAT Phase II series. Note that a similar combination was used in the short-lived OSCAR IV spacecraft in 1966.

This transponder, designated **Mode J,** operates with an input frequency passband of 145.90-146.00 MHz, and an output frequency passband of 435.10-435.20 MHz. Power output is about 1-2 watts PEP, and the output passband is **inverted,** i.e., upper-sideband uplink signals become lower-sideband downlink signals. The transponder translation frequency (input frequency plus output frequency) is 581.1 MHz ± Doppler. Uplink sensitivity for one watt output is —105 dBm, corresponding to an eirp from the ground of 8* watts for a distance to the satellite of 1200 miles. Note the greatly improved sensitivity of this mode, and keep your power down. A 100 milliwatt beacon carries telemetry at a frequency of 435.095 MHz.

The relationship between the uplink (**fu**) and downlink (**fd**) is as follows:

$$\mathbf{fd} - 581.1 \text{ MHz} - \mathbf{fu} \pm \text{Doppler}$$

where both **fd** and **fu** are in MHz.

ANTENNA SYSTEM

Both the Mode A and Mode J transponders use the same receiving antenna, a canted turnstile comprised of four 19-inch lengths of ½-inch carpenter's rule fed by a hybrid and matching network so as to develop circular polarization. One port of the hybrid feeds the Mode A receiver such that left-hand circular polarization is required by users in the Northern hemisphere, and right-hand circular polarization in the Southern hemisphere. A second port of the hybrid is connected to the Mode J receiver such that right-hand circular polarization is required in the Northern hemisphere, and left-hand circular polarization in the Southern hemisphere. The antenna gain should approach 5 dB in the —Z direction (i.e., toward the bottom of the satellite).

The Mode A ten-metre downlink antenna is a linearly-polarized dipole, oriented perpendicular to the stabilization magnets in the spacecraft as in AMSAT-OSCAR 6 (but unlike AMSAT-OSCAR 7, which has the ten-metre antenna paprallel to the axis of the magnets).

The Mode J 435 MHz downlink antenna is a simple monopole, linearly polarized, and located on the top of the spacecraft. Note that its location may result in some radiation shielding at high Southern hemisphere latitudes.

* Sensitivity may decrease by a factor of 10 (10 dB) under different conditions of battery that at certain times as much as 80 watts may be required.

TELECOMMAND SYSTEM

A five-function telecommand system of a new design is carried out on AMSAT-OSCAR D. The system is based on the best features of the AMSAT-OSCAR 6 and 7 telecommand systems, and is designed to be virtually immune from noise and interference. The command functions are:

Mode "A" Select (two-to-ten metre transponder **ON**).

Mode "J" Select 2m-to-70cm transponder **ON**).

Mode "D" Select (Recharge mode; both transporders **OFF**).

Ten-metre Antenna Deployment.

Ten-metre Antenna Reset.

TE! EMETRY SYSTEM

Note: Bold letters are inferior letters.

Ch. 1 — Total Solar Array Current
IT = 7.15(101-N) ma.
IT = 7.15(101 — N) ma.

Ch. 2 — Battery Charge-Discharge Current
IBat = 57(N-50) ma.
IBat = 57(N — 50) ma.

Ch. 3 — Battery Voltage
VB = 0.1N + 8.25 volt

Ch. 4 — Baseplate Temperature
Tbp = 95.8 —1.48N(°C)

Ch. 5 — Battery Temperature
TBat = 95.8 —1.48N(°C.

Ch. 6 — RF Power Out. — **Mode J**
PJT = 23N milliwatts

A sample telmetry frame would be:

120 255 380 451 620 HI 120

Note that, unlike AMSAT-OSCAR 6 and 7, AMSAT-OSCAR D has only one parameter per line (AMSAT-OSCAR 6 and AMSAT-OSCAR 7 had 4). As a result, a complete telemetry frame is sent in approximately 20 seconds.

POWER SYSTEM

The spacecraft contains solar panels on its four sides (along the +X, —X, +Y and —Y axes), and on the top (the +Z axis). No panels are contained on the bottom (—Z axis), since this is where the spacecraft attaches to the launch vehicle. The solar cells, combined with a 12-cell, six-ampere-hour rechargeable nickel-cadmium battery should be adequate to power the spacecraft with a positive power budget in Mode A for several years even considering solar cell degradation in the radiation environment. The power drain in Mode J, however, is somewhat larger, and so the Mode J transponder probably cannot be operated continuously.

A battery charge regulator is also contained which converts from the 28-30 volt solar array voltage to the 14-16 volts required by the battery. It also tapers the charge rate so that the battery trickle-charges as the battery approaches full charge (as indicated by the battery voltage).

STABILIZATION SYSTEM

Four permanent magnets located inside the spacecraft and aligned along the Z axis provide stabilization, as in AMSAT-OSCARs 6 and 7. The polarity of the magnets is such that the top (+Z axis) of the spacecraft always points toward the magnetic North Pole of the earth. Hysteresis permalloy damping rods mounted behind the +X, —X, +Y and —Y solar panels are designed to reduce the spin of the spacecraft about the Z axis, functioning in a manner similar to a shorted transformer turn as it cuts the lines of flux of the earth's magnetic field. The permalloy rods are left over from AMSAT-OSCAR 7, which successfully used the same type of stabilization system.

TELECOMMAND VERIFICATION PROCEDURES

AMSAT-OSCAR D's telecommand and telemetry systems have been designed to provide two means to easily verify whether the spacecraft is accepting commands. First, when the telecommand system has been enabled and is ready to accept a command, the Morse code telemetry will be interrupted and an unmodulated carrier wil be heard on the beacon frequency. The beacon will revert back to Morse code when the telecommand system is no longer enabled.

The second method of telecommand verification is to use the "Ten-metre Antenna Deployment" command. This will cause a series of keying pulses to be heard on the telemetry beacon in place of the Morse code telemetry if the command has been accepted. The "Ten-metre Antenna Reset" command should be sent soon afterward in order to restore the beacon to the Morse code telemetry mode.

TELEMETRY INTERPRETATION

The most important telemetry channel that will affect operations decisions is channel 3 (battery voltage). In Mode A the spacecraft should maintain a positive power budget so that there should not be a net discharge of the battery over an orbit average. Mode J operation, however, requires somewhat more power, which may result in a net discharge of the battery, especially under conditions of high transponder loading, and therefore it will be necessary for telemetry and telecommand stations to keep a close watch on the battery voltage so that action can be taken as necessary to command the spacecraft into Mode D (the recharge mode) before the battery discharges too far. Three cut-off levels are specified below:

Red Level "A": 1.2 volts/cell) Ch. 3 = 61 counts.
Red Level "B": (1.1 volts/cell) Ch. 3 = 50 counts.
Red Level "C": (1.0 volts/cell) Ch. 3 = 38 counts.

Red Level "A' should be used during the first year or so of the spacecraft's life as the cut-off point below which telecommand stations should command the satellite into Mode D for recharging. Later in the spacecraft's life as the battery discharge characteristic curve changes, Red Level "B" should be used, and Red Level "C" should be used if there is evidence of deterioration of the battery, or if it is desired to recondition the battery.

Channel 1 (solar array current) provide an indication of whether the spacecraft is in the sun or eclipse (it should read in the nineties in counts when in eclipse). Fluctuation in ch. 1 telemetry is the best indicator of the rate of spin of the spacecraft, along with observations of fading, particularly of the 435 MHz Mode J downlink signal from the quater-wave 435 MHz monopole antenna.

Channel 2 (battery charge-discharge current) gives information on whether the battery is charging or discharging. A reading larger than 50 counts indicates that the battery is charging, while a reading of less than 50 counts means the battery is discharging. There is a two-second integration time associated with the current telemetered on this channel. The total power drain of the spacecraft can be determined by observing channel 2 while the spacecraft is in darkness (as indicated by channel 1, which should read in the nineties in darkness).

Telemetry **channels 4 and 5** (baseplate temperature and battery temperature) should generally track within a few degrees (except perhaps in the first day or so after launch when the spacecraft has not yet stabilized a thermal equilibrium). Experience from AMSAT-OSCARs 6 and 7 indicate that the battery can overcharge and overheat during periods of the year when the spacecraft sees the most sunlight. If this is the case, channel 5 may exceed channel 4 in temperature by 10 degrees or more (Centigrade), and action should be taken to reduce this overheating. This can be accomplished by keeping the spacecraft in Mode J to consume any extra charge current from the battery.

Channel 6 is a measure of the Mode J transponder 435 MHz RF power output. Associated with the telemetered readings is an integration time of 2.5 seconds, so that it is average power rather than transponder. The Mode A transponder power consumption (largely determined by the PA current) can be measured by observing channel 2 telemetry as noted above.

OPERATING SCHEDULE

Since the prime mission of the AMSAT-OSCAR D spacecraft is to use the Mode A transponder for the ARRL OSCAR educational programme in schools, the spacecraft may be left in Mode A during weekdays (Mondays through Fridays, USA time) and put in Mode J on week-ends. Additionally, if not an excessive burden on the telecommand stations, evening orbits in the Western Hemisphere (morning orbits in the Eastern Hemisphere) can be switched to Mode J, battery permitting. In any case, all operation in Mode J will require careful monitoring of the battery charge level (as indicated from channel 3 telemetry, battery voltage). The power budget may not support the Mode J transponder for full-time, continuous operation in this mode over an entire week-end.

AMSAT-OSCAR D will operate in a 560 statute mile orbit, i.e., at just over half the altitude of the 910 statute mile orbit of AMSAT-OSCAR 7. Thus communication ranges will be different. The usable time on an overhead pass will be about 18 minutes instead of the 22 minutes provided by AMSAT-OSCAR 7 and the horizon range will be 2000 miles instead of the 2450 miles of AMSAT-OSCAR 7. This means, for example, that trans-Atlantic communications will still be possible but not as often as with AMSAT-OSCAR 7.

Keeping track of this satellite is going to be much simpler than for AMSAT-OSCAR 7. It will come into range at the same time each day (more or less); the overheard descending node pass is planned for 9.30 a.m. local time.

OSCAR PREDICTIONS — JUNE 1978 — AO7

Orbit	Mode	Date	Time Z	Long.
16203	B	01	0115	76
16215	A	02	0014	6
16228	B	03	0108	74.7
16240	B	04	0008	59.6
16253	A	05	0102	73.2
16265	B	06	0001	58.0
16278	B	07	0056	71.6
16291	A	08	0150	85.2
16303	B	09	0049	70.1
16316	B	10	0144	73.6
16328	A	11	0043	68.5
16341	B	12	0137	82.1
16353	B	13	0037	66.9
16366	A	14	0131	80.5
16378	B	15	0030	65.4
16391	B	16	0124	78.9
16403	A	17	0024	63.8
16416	B	18	0118	77.4
16428	B	19	0017	62.2
16441	A	20	0112	75.8
16453	B	21	0011	60.7
16466	B	22	0105	74.3
16478	A	23	0005	59.1
16491	B	24	0059	72.7
16504	B	25	0153	86.3
16516	A	26	0053	71.1
16529	B	27	0147	84.7
16541	B	28	0046	69.6
16554	A	29	0141	83.2
16566	B	30	0040	68.0

ORBITAL PREDICTIONS — MAY 1978 — AO8

Orbit	Date	Time Z	Long.
786	01	0127	62.9
800	02	0132	64.2
814	03	0137	65.5
828	04	0142	66.9
841	05	0004	42.45
855	06	0009	43.8
869	07	0015	45.1
883	08	0020	46.5
879	09	0025	47.8
911	10	0030	49.1
925	11	0035	50.5
939	12	0040	51.8
953	13	0045	53.1
967	14	0050	54.5
931	15	0055	55.8
995	16	0101	57.2
1009	17	0106	58.5
1023	18	0111	59.9
1037	19	0116	61.2
1051	20	0121	62.5
1065	21	0126	63.9
1079	22	0131	65.2
1093	23	0136	66.6
1107	24	0141	67.9
1120	25	0003	43.4
1134	26	0008	44.8
1148	27	0013	46.1
1162	28	0019	47.4
1176	29	0024	48.8
1190	30	0029	50.1
1204	31	0034	51.5

Period 103.232 minutes.
Longitude increments 25.81°. ■

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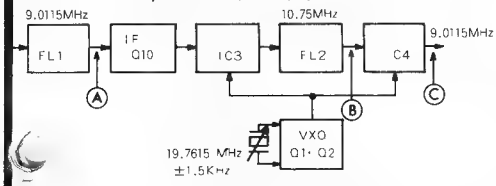
HF TRANSCEIVER

Let's look at the "T" factor!! Remember the days when separate linears and converters for **each** band was the ultimate in transmitter and receiver performance? You get it with the **IC701** 1978 style.

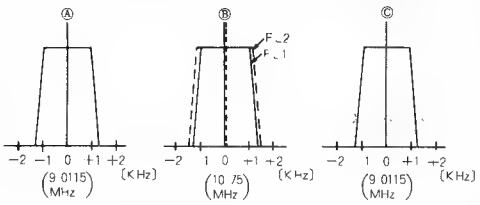
Transmitter: Broadband final, no tuning required, uses separate final low pass filters on each band, fed from a pair of husky transistors in class B. Optimised separate driver circuits with temperature compensation in the driver stages enable a power output of around 100 watts pep on all bands and modes (Japanese domestic version has reduced power on some bands and also different frequency ranges).

Receiver: The same final low pass tank circuits are used for the input circuits on receive. **Separate** RF amplifiers using dual gate MOSFET amplifiers pass the signals to a Schottky diode double balanced mixer giving a first IF of 9.0115 MHz. Thus gain of the receiver is optimised on all bands giving a sensitivity figure of 0.25uV for a SN/10dB on any band. As it is to be expected, the cross modulation performance using this type of mixer is exceptional and superior to competitive transceivers.

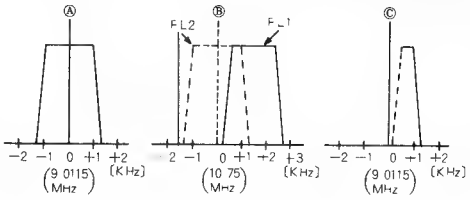
The system used for **bandpass tuning** is unique to the **IC701**: The receiver IF system uses two filters —



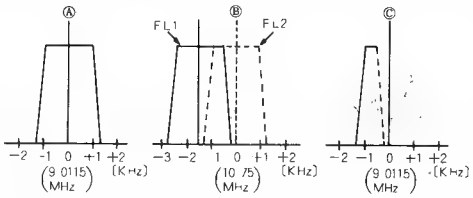
FL1 centre freq. is 9.0115 with a bandwidth of ± 1.15KHz. FL2 centre frequency is 10.75MHz with a bandwidth of ± 1.2KHz. The VXO has a centre frequency of 19.76MHz which can be varied by the front panel control ± 1.5KHz. The following diagrams show how signals pass through the system when Band Pass control (VXO) is at centre position —



When VXO (Band Pass tune) is clockwise the signals from FL1 are mixed to the new frequencies of 10.7503 to 10.7527 MHz by the VXO on a freq. of 19.7630MHz. The resultant frequencies if plotted on the FL2 filter bandwidth would look like this —



Remember, dotted shape is the filter shape of FL2 and solid line is mixed output signals from FL1. Then, since the upper frequency passband limit of the 10.75MHz filter, FL2 is 10.7512, not all the signals will be passed by the filter. Conversely, when the passband control is in the fully counter clockwise position the VXO is on a frequency of 19.76MHz. The diagram now looks like this —



The 10.75MHz signals from the mixer IC3 will be from 10.7497 to 10.7473MHz. As the passband of the filter is 10.7512 to 10.7488MHz not all the signals will be passed. Again the passband has been narrowed to 900Hz and offset to the opposite side of the centre frequency of the crystal filter. Try an example: Suppose you are receiving a signal whose input to the mixer IC3 is 9.0115 and QRM is on 9.0125 i.e. 1KHz away. With the BP control at centre both signals will be heard as the resultant signals will be 10.750 and 10.749MHz and both are within the passband of the filter.

By turning the BP control a resultant frequency of 10.748 MHz is reached which puts the 9.0125MHz signal outside the passband of the filter.

The signal you want on 9.0115 when mixed with the VXO at IC4 becomes the original 9.015MHz signal. Sit down with the figures and you can see why this type of BP tuning is so unique.

The big "T" is endless.
A VFO with **optical tuning,** no variable capacitors are used by **ICOM** under agreement with **Collins** Radio USA.

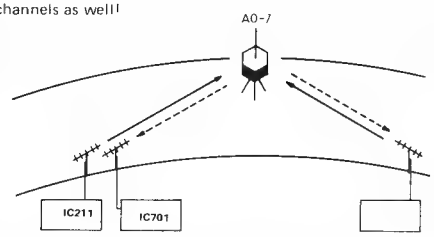
Separate VCO for each band is used to reduce spurious and birdies. **A fan** for the finals that only works if you run for extended periods on RTTY or key down conditions. If a danger point temperature is reached the fan doubles its speed and the digital display flashes to tell you to quit transmitting!

Twin VFOs are built-in for split band working. No need for an external VFO.

Narrow CW filter and **desk mic** (condenser electret type) are all part of the package.

The built-in **speech processor** uses the 9.0115MHz filter in the passband tuning circuit. Compression control on the front panel controls the drive level and hence the amount of compression.

The same control also acts as power output control on CW and RTTY. Since we all photograph these beauties from the front you would not notice the 24 pin accessory socket on the rear panel. Voltages and functions available at this point enable **remote control** facilities to be added, but before you get out the design tools, **ICOM** have thoughtfully provided a remote control head as an optional accessory. Size is about that of a calculator and has its own CPU, digital readout and control buttons. You can select frequencies, change bands, scan and when connected to the 2m IC211, set up duplex channels as well!



The **IC701** can be interconnected with the IC211 for Oscar work with due allowance being made for doppler shift.

The day of microprocessor interface with an HF transceiver has arrived While the others are still fooling around with valves **ICOM** have produced a **state of the art** HF transceiver.

And the **IC701** is supported by **VICOM** who have been factory briefed on the service and alignment procedures.

Bring a new dimension to your HF operating the new **ICOM IC701.**

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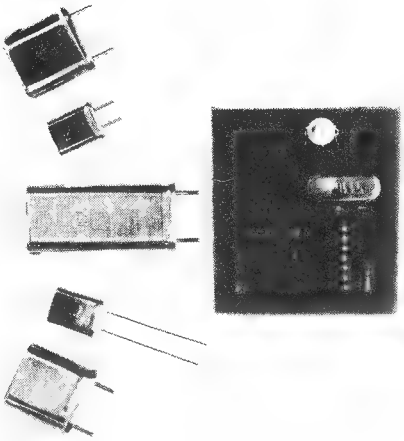

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NEW RELEASE

MMT432/144'S' Transverter, featuring 2 switchable ranges. 432 – 434 434 – 436 MHz, input frequency 144 to 146 MHz.

Get away from the maddening crowd below. The MMT432/144'S' 434 Linear Transverter will get you there. This solid state linear made transverter allows you to operate your 144 MHz SSB, AM, FM or CW units at 432 MHz .... up where there still aren't a lot of people. Amateur Electronic Imports is the exclusive Australian distributor for this precision British made unit from Microwave Modules, Ltd.

NEW RELEASE for OSCAR 8 down link – 70CM converter model MMC434/28, coverage 434 to 436 MHz. PRICE $51

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SPECIFICATIONS:
Frequency coverage: 432–436 MHz.
Input frequency range: 144–146 MHz.
DC power requirements: 11-13 volts (12 volts nominal).
Current consumption: 250 mA quiescent 2.1 Amps peak.
RF connectors: 50 ohm BNC sockets
Power connector: 5 pin DIN socket
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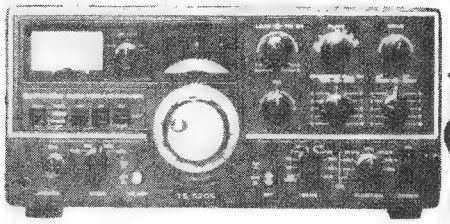

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Five digit LED display.
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for 10 thru 80 Meters

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including radial traps.
Hidaka VS–41/80KR ... **$110**
Complete radial kit to suit VS–41 ..... **$32**

BEAM ANTENNAS

Hidaka VS–22 duo-band 15/10m.
OUR PRICE: **$169**
Hidaka VS–33 20/15/10m.
OUR PRICE: **$259**

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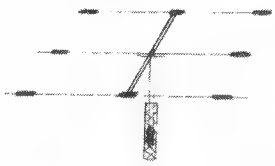

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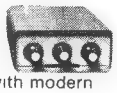

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CHIRNSIDE ELECTRONICS. 26 Edwards Road, Lilydale, 3140. Phone (03) 726 7353

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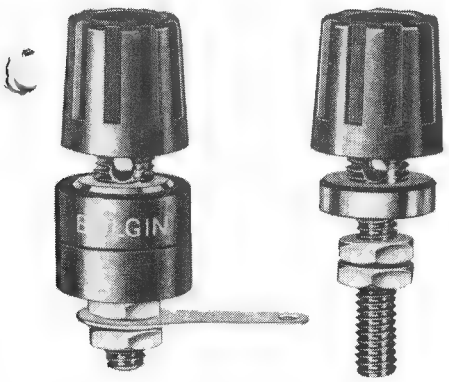
AROUND THE TRADE

NEW BULGIN TERMINALS

Two new 4 mm terminals have been added to the already extensive Bulgin range. Designated TL10 and TL11, they are matched in appearance and design. The TL10 is insulated from the panel by moulded bushes, and the TL11 is live to the panel. Nominal current rating for both terminals is 15 amps. They feature a 2.3 mm cross hole and a deeply ridged screw-down knob, moulded in red or black Polypropylene. The top of each terminal also accepts a standard 4 mm test plug. All metal is nickel plated brass.

The Bulgin company operates a direct mailing list for all their new developments in plugs, sockets, lamp holders, fuse holders, connectors, and similar accessories, many of which are ideal for original equipment manufacturers. Details from R. H. Cunningham Pty. Ltd., PO Box 4533, Melbourne 3001.



CHANGE OF ADDRESS

Vicom International Pty. Limited have moved to new premises in South Melbourne as part of an expansion program into specialist communications electronics. The new address is 68 Eastern Road, Phone 699 6700. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

CQ November 1977

XJ3ZZ/1 St. Paul Island DXpedition; Machine Arithmetique de Pascal; World Administrative Radio Conference (WARC 79); CQ WW DX Contest All-time CW and USA; The "Multi-V", A Multi-Band Antenna; MFJ-8043 Electronic Keyer; The Li'l Zapper Versatile LV Supply; MFJ-16010ST Super Antenna Tuner; QRP: A Solid State VFO for 7-14 MHz; Quads and Multi-Element Quads; An RTTY Primer, Pt. 2; Amateur Radio Station Installation Tips.

CQ December 1977

Dxpedition to Nepal, 9N1MM/7; A Bulk Nicad Recharger; Results of the 1977 CQ WW WPX SSB Contest; Vacuum Relay QSK in a Commercially Equipped Station, Part 1; Put a Tape Recorder to Work in Your Shack; SSTV in Romania; Using Your Tower as an Antenna; Solid State VFO Transmitter for 7-14 MHz; Interesting Antennas from Overseas; Getting the Most Out of Test Equipment; Amateur Radio Station Tips, Part 2; Geographical Limits for DX Award Certificates; Story of the Month, Frank M. Koval W8RSW.

CQ January 1978

Navigating to 80 metre DX; The 22nd Annual CQ WW WPX/SSB Contest; Pictures from Last Year's WPX/SSB Contest; A Contact Printer for Printed Circuit Boards and Photographic Film; The RFE-100 Digital Frequency Display; A Single Wire Antenna for 160, 80 and 40 Metres; A Message from the Publisher; The Kenwood TR-2200A, 2 Metre Portable Transceiver; A Marathon Heard, Not Run; Improved Selectivity for the Regency HR-2 Transceiver; An Audio Circuit Breadboarders Delight; More HW-8 Mods; Gaucho Hat Antennas and Much More; Slow Scan Station of the Month, W6WDL, Receiver Considerations for the Novice; Okino Torishima; Short Skip Charts for Jan. and Feb. 1978

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Two Metre Stripline Kilowatt; Improving the Accuracy of Your Frequency Meter; S-Line Syllabic VOX System; 10-GHz Hybrid-Tee Mixer; Calculator Aided Circuit Analysis; High Performance 20 Metre Receiver; Repeater Kerchunk Eliminator; Low-Cost Power Supply; Microprocessors: Data Converters.

HAM RADIO November 1977

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HAM RADIO December 1977

Problems and Cures for Present Day Receivers; IF Filter Converter; How to Choose TTL Sub-series; 500 watt Power Supply; Voice Operated Gate; Low Power RF Wattmeter; Drift Correction Circuit for Free-Running Oscillators; Active Bandpass Filters; Phase Locked Receiving Converter.

BREAK-IN December 1977

VHF Antenna Measuring; Base Loaded Verticals, The HF Polished Gem; Wellington Branch 50 Aerial Tuner Mark 1 for Balanced Aerials; A Kiwi on Safari; How a Grade 3 Amateur Received "Break-In" Treatment; The Beginning.

SHORTWAVE October 1977

A Four-Band Versatile Vertical; The Poldhu Story; Trees as Radiators; Unusual DX; A Simple HF/VHF/UHF Gate Dip Oscillator and Wavemeter.

SHORTWAVE November 1977

VHF Bands (Band-planning); The Datong UC/1 Up-Converter; The GM3RFR Broomstick Antenna; Time Out Warning Circuits; QRP Scene 1077; Testing a Museum Piece.

RADIO COMMUNICATION January 1978

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Two Metre Scanner; Try the Mini-Timer; High Frequency Utility Converter; RTTY Scratchpad Memory; Build The CW Filter; The London Bus Tuner; The W1BB Story; Ten Watts on 2; UHF SWR Indicator; At Last a 10m Band Plan; Event Timer with a Memory; Sheet Metal Brake; The Easy Ammeter; Try a Conduit Vertical; The IC-PC Connection; An 82S23 PROM Programmer; Practical PS Design; FRG-7 Impressions; SSTV Meets the SWTP 6800; Aim Your Antenna with a Micro; Regulated Nicad Charger; Complete Repeater Control System; Transmission Line Primer; Things Remembered; Digital Bargain Hunting; More Channels for the IC-22S; Try A Scan'e-Talkie; Current Saver Counter; Instant QSO Recall System; New PC Techniques Unveiled; How to Use IC's; Uncle Sam's Surplus List.

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CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

May

6/8	Vermont QSO Party
13/14	USSR "CQ-M" Contest
19/20	YL SSBers QSO Party
20/22	Kansas QSO Party
27/28	Francophones Countries Contest

June

4	Townsville Pacific Festival Contest
2/5	CHC/FHC/HTH QSO Party
17/18	West Virginia QSO Party

July

15/16	Sunshine State—Jack Files Memorial Contest (VK4 only)

TOWNSVILLE PACIFIC FESTIVAL CONTEST 1978

This contest is promoted in conjunction with the Townsville Pacific Festival, and aims to increase activity on all Amateur Bands by stations in Australia, New Zealand, Pacific Islands and all countries bounding the Pacific Ocean.

Rules:

1. Time of Contest: The contest is run for 8 days, from 0001 GMT Saturday, 27th May, to 2359 GMT Sunday, 4th June, 1978.
2. Sections: A. Transmitting all bands — Phone only. B. Transmitting all bands — CW only. C. Transmitting all bands — Open. D. Transmitting VHF and UHF — VK only. E. Receiving all band — Open.
3. Logs: These are to show the section entered and points claimed for each contact. This is most important, as if points claim is not completed only 1 point per contact will be allowed. VHF logs must show distance in kilometres between stations.
4. Contacts: A. CW to CW contacts count as double score. B. One (1) contact per band per mode a day only. C. No cross band contacts. D. Repeater contacts do not score.
5. Awards: Perpetual Trophy is held by TARC, and it will be inscribed with the name of the winner, who will receive a smaller trophy. Overseas stations (excluding VK, P29, ZL) with the highest score will receive a "Pacific Festival" medallion. Section winners will be awarded a certificate. Commemorative QSL cards will be issued.
6. Scoring — HF stations.

Scoring table — VK, ZL, P29 stations.

VK —	1	2	3	4	5	6	7	8	P29/ VK9	ZL	0
VK0	7	7	7	7	7	7	7	7	7	7	—
VK1	—	1	1	2	3	4	2	4	5	3	7
VK2	1	—	2	1	2	4	3	4	5	3	7
VK3	1	2	—	3	2	4	1	6	4	3	7
VK4	2	1	3	—	4	6	5	2	1	4	7
VK5	3	2	2	4	—	1	3	4	5	4	7
VK6	4	4	4	6	1	—	4	1	5	6	7
VK7	2	3	1	5	3	4	—	6	5	3	7
VK8	4	4	6	2	4	1	6	—	2	4	7
P29/ VK9	5	5	4	1	5	5	5	2	—	6	7
ZL	3	3	3	4	4	6	3	5	6	—	7

VK, ZL, P29 to other Pacific seaboard countries and islands — 1 point.

BONUS POINTS — Except VK4 stations:
15 points for contact with VK4WIT.
9 points for contacts with other Townsville stations.

BONUS POINTS — VK4 stations:
1 point per contact for working VK4WIT or other Townsville stations. (Intrastate contacts not otherwise permitted for scoring.

BONUS POINTS — Overseas stations, excluding ZL, P29:
3 points for contact with any VK station.
5 points for contact with any VK Club station.
9 points for contact with any Townsville station.
15 points for contact with any VK4WIT.

ALL STATIONS
160 metres — 5 bonus points per contact.
RTTY and TV — 10 bonus points per contact.
CW/CW — double points.
Scoring — VHF/UHF stations:
0- 50 km — 1 point.
50-100 km — 2 points.
100-200 km — 3 points.
200-400 km — 4 points.
400 km and over — 5 points.

BONUS POINTS
VHF/UHF stations only — other than Townsville stations— Contacts with your local club station add 15 points only if your club station has contacted VK4WIT in preceding 24 hours (contact number must be recorded).

Townsville stations receive one point per contact only.

7. Identification: All station identify for the ease of scoring, e.g. (Phone) VK4WIT Townsville; (CW) VK4WIT/TVL.

Send logs to:—
Townsville Pacific Festival Contest,
VK4WIT — CHC No. 6568,
PO Box 964,
TOWNSVILLE 4810,
Australia.

Closing date of entries: 23rd July, 1978. ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
I do not readily rush into print but I do support the letters of Steve Gregory VK3OT, although I do say this, I think in South Australia we are better off in this regard. Most of our suppliers are old hams and genuine. It's the new ones that are out to make a quick buck, especially on CB gear, which doesn't interest me anyway. It is astonishing the way prices have escalated in the last two years.

I can understand the reason for your comments. I have been in the retail game and I readily appreciate both sides of the game, but believe it pays to shop around these days unless you don't mind being "taken" or have a large roll which eases the problem.
73s.

Cam Patterson VK5XR. ■

The Editor,

30/3/78

Dear Sir,
I was sorry to see that the letter from Jim Davis VK7NOW had been published without a footnote correcting the error he has made; which may have caused others who may be erecting a G5RV aerial unnecessary trouble.

In paragraphs 5 and 6 he claims that the textbooks and AR are wrong in giving 29 ft. 6 in. as the length of the ribbon stub. He then asserts that the correct length of 300 ohm ribbon is 32 ft. 6 in., on the strength of "hearsay evidence".

The footnote should have referred him to the article in AR in which the author G5RV states, "if 300 ohm ribbon is used allowance must be made for the velocity factor of this type of twin lead". Depending on the dielectric used for the ribbon, the velocity factor can vary from 0.95 down to 0.56 for PVC. For the stub to be exactly 29 ft. 6 in. the velocity factor is 0.8676. For the stub to be 32 ft. 6 in. a velocity factor of 0.956 is needed, so no doubt ZL2AGU is using the TV ribbon made of two separate insulated wires held apart with spacers every six inches along the line, a very efficient stub.

Using ribbon made of solid PVC the stub length would only be 20 ft. 5 in. long.

I very much doubt that my friend Louis said that the textbooks and AR are wrong, as he is a professional engineer with, to my knowledge, more than forty years experience dealing with aerials and installations.

Yours faithfully,
Newton Wade VK4QW. ■

Max Stark VK3APZ
8 Bardia Ave., Seaford.
10/3/78

The Editor,
Dear Sir,

PIRACY v. CB

In answer to the letter from Leonard J. Shaw, page 25 AR Jan. '78, I beg space to answer his questions and implicit criticisms. My shack, such as it is, has always been open to anyone with a problem, CB or not. As an ex-Scoutmaster I have fostered interest through Jamboree on the Air with many youths only to see them rush away, subject to peer group pressure, and become "good buddies". I have repeatedly advised about regulations and licensing and where there has been apparent a genuine interest in radio from a "good buddy" I have recommended novice licensing as a relatively simple way to enjoy a fairly deep involvement in amateur radio. Generally Mr. Shaw, I have wasted my time and my breath because we live in an age when nobody will listen and everybody knows better.

I take exception to the fact that I "tar all CBers with the same tired old brush". I acknowledged the fact that there are numbers, after a first blooding in CB, working towards novice and full call signs. I also acknowledge the fact that there are undoubtedly some thousands of responsible CBers interested in using the CB band for its prime purpose, i.e. short range reliable communication for chit chat, general interest groups, clubs, mobileers, minor civil emergencies, maritime small craft communications and four-wheel drivers to name a few. But, Mr. Shaw, all these genuine CB communicators and communications are being frustrated by the sheer overwhelming number of illegal undisciplined uncaring unlicensed unskilled knob flickers who continue to rout people from 27 MHz despite licensing.

I made the mistake in my previous letter (AR Nov. '76) of quoting dates of pirate invasion of 2 metre FM repeaters. There is no need. The violation of 2 metre FM repeaters in Melbourne on week nights and all weekends is monotonous in its content, repetition and continuity. "CQ repeater channel 2. Come back good buddy", is now commonplace. The use of the repeater to rebroadcast AM radio or tapes and records with resultant copyright infringement, notwithstanding illegal transmission, is also becoming as common as it is on 27 MHz. Amateur satellites could be next. Clearly radio inspection regulatory action is past being a requirement — it is a desperate need.

Observation of Post and Telecommunications recruitment as advertised in the Commonwealth Government Gazette is indicative (as with so many other Depts.) that the emphasis is on clerical and administrative recruitment, not technical staff with the ability to police regulations i.e. track down and secure illegal transmissions. Further, if this illegal activity is not suppressed by the authority responsible the inevitable will probably happen. Vigilante groups of either frustrated amateurs or frustrated CBers will do their own leg work and confrontations could and most likely will occur, with resultant unpleasantness.

If there is a subscribing member of the WIA in regular receipt of AR who could not be bothered signing and returning the Ministerial Petition enclosed in December and January AR, then I suggest that he has no real interest in the future of amateur radio.

Thanks to the editorial staff and contributors who make AR such a readable publication. I thought the December issue was colossal. ■

N. W. Lavelle VK3AHB
4 Wembley Court,
Forest Hill, Vic. 3131

The Editor,
Dear Sir,

For reasons possibly known only to themselves, Alf Chandler VK3LC, and Ivor Stafford VK3XB, seem to have taken the letter I wrote last September (which appeared in AR for November '77) as an affront to the Intruder Watch.

To clarify the situation I shall restate the reason for the original letter.

I found (and find) it strange that the greatest interference ever experienced by amateur radio (the Russian "Woodpecker") had been almost totally ignored by all journals devoted to amateur radio. I find it hard to enthuse over future international frequency allocation conventions when a signatory to the current international agreements breaks those agreements and renders whole amateur bands unusable whenever it so desires.

In the case of AR, I do not believe that a single letter from an Intruder Watch Co-ordinator, in the correspondence columns some eighteen months after the interference started constitutes adequate coverage of a subject of vital importance to members — just as I would consider myself inadequately served by the national news media if man's landing on the moon had been covered by a single letter in the correspondence column some eighteen months after the event.

To paraphrase a legal maxim, not only must associations endeavour to protect the interests of members, they must be seen to be endeavouring to protect those interests.

Mobile News (the journal of the Amateur Radio Mobile Society) of August '77 and Pat Hawker G3VA, in his column in Wireless World of October '77 have, in fact, brought the Russian interference to the attention of their readers.

I should like to thank and congratulate Ivor for his fine letter in February AR. Maybe you're right, Ivor. Maybe we can't force the authorities to act on our reports. Maybe we can't force the European Common Market to change the entry terms for our goods either, but I hope we do a little more than fill out the odd prescribed form. I'd prefer continued friendly persuasion to force anyway. Who knows? — we don't appear to have a lot to lose by trying. ■

The Editor,
Dear Sir,

With reference to the letter from Steve Gregory (VK3OT) in the March copy of Amateur Radio, it is felt that his accusations regarding the amateur radio retailers should not be allowed to go unchallenged.

He indicates that an increase in price of an FL-2100B is "nearly 50 per cent" (actually 44.5 per cent) since 1976, and yet in only the past one year:

(a) The Australian inflation rate was approximately 9 per cent.

(b) The effective increase in value of the Japanese yen against the Australian dollar was approximately 24 per cent.

(c) The cost of units supplied to Australian dealers from Japanese sources has risen almost 20 per cent.

The cumulative net effect of this is a 62 per cent rise in only one year!

Despite these enormous cost increases, Dick Smith Electronics has seen fit in many cases to actually **reduce** the price of certain Yaesu lines below the price they were selling for last year and those of you who read American magazines will notice that our prices are now comparable to the prices the American amateur has been enjoying for years (not forgetting US prices are all plus applicable sales tax).

This company is, and will continue, to supply the Australian amateur operator with the best quality equipment at the lowest possible prices, including full warranty protection.

Yours faithfully,
Dick Smith Electronics Pty. Ltd.
J. Dennis, Amateur Radio Manager. ■

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OPTION 3 — Stacked Arrays of above Antennae inc. feed harness and all mounting hardware	**POA**
7. **LINEAR POWER AMPLIFIER** — 40W & 80W PEP 70 cm, 5 dB gain, VSWR protected BNC input and type N output, connectors. No T/R switching provided unless requested	**POA**
8. **POWER SUPPLY,** 13.8V 4 amp (S.E.C. approved). Robust!	**$65.00**

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LOCAL OSCILLATOR ASSEMBLY FOR 1296 MHz APPLICATION (including drive level monitor output) — 5-10 mW output.

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YD-844 Base microphone. Completes the Yaesu station. **Cat C-1116** **$39.00**

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FT-301 The all solid-state HF rig. 12 volt supply, ideal for mobile or base use. An outstanding amateur rig. 160 — 10 metres. **Cat D-2870** **$995.00**

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FT-227R 2 metre memorizer set. 800 channels, simplex or repeater. Mobile operation (12V) with 1 or 10W output (switchable). **Cat D-2890** **$335.00**

FT901D This must be the ultimate. Beautiful HF set for all modes (even FM) runs off 240V, 6146 finals. Outstanding specifications. **Cat D-2854** **$1275.00**

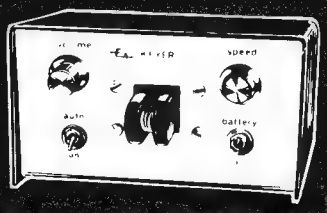
DC—DC converter: Use the 901D as a mobile. **Cat D-2856** **$75.00**

FRG-7 Solid state communications receiver using Wadley Loop. 12/240V, superb stability, makes an ideal ham receiver too. **Cat D-2850** **$350.00**

QTR-24 24 Hour Ham clock for instant time zone conversion. **Cat X-1054** **$33.00**

STOP PRESS! 'Getting to know OSCAR' as reviewed in the last issue of Amateur Radio is available from Dick Smith Electronics. Find out more about this fantastic method of communication. Supplies of this book are limited, so get your copy NOW! **Getting to know OSCAR — Cat. B-2220** **$5.50**

SAVE $50+ ON AN ELECTRONIC KEYER



Most keyers cost at least $80 — PLUS the paddle. Here's one you can build for half that including the paddle. Battery operated, complete kit. Has oscillator built in. Incredible value, see design in E.A. March. (battery extra). Cat. K-3470

COMPLETE KIT

INCLUDING PADDLE ONLY $37.50

PADDLE ONLY: Want to make your own? The paddle is available as a separate item. **Cat D-7103** **$17.50**

MORSE CODE CASSETTES: Learn Morse the easy way. Graduated steps to 15WPM. **Cat D-7106** **$7.90**

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$10-$24.99	$2.00
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I'M DESPERATE AGAIN!

I've just discovered a pile of amateur radio equipment in the corner of the warehouse that everyone (including my lovely computer) had forgotten about. Nearly fired the computer — but that would break up a beautiful relationship . . .

To move this stock, I have decided to sell it off **NEAR, AND EVEN BELOW, COST.** That's right — I'm going to lose money — but I desperately need cash to buy new stock.

So you reap the benefit. Check the savings on the equipment listed. Then hot-foot it to your nearest Dick Smith store before you miss out. Remember some stock is definitely limited. Hurry!

SOME UNITS MAY BE SLIGHTLY SHOP SOILED — BUT WE WON'T CHARGE FOR THE DIRT!

D-3009: Multi quartz 16 2m transceiver Comes with 1 set of rocks; 23ch capacity	Was $228 Now $199.50 SAVE $28.50 while stocks last	
D-3040: IC202 2m SSB & CW transceiver 144–145MHz, portable. 3watts	Was $219.50 Now $189.00 SAVE $30.00 while stocks last	
D-3100: TS700A AC/DC 2m , fm/ssb/cw Outstanding value transceiver, 144–148	Was $725.00 Now $575.00 SAVE $150.00 while stocks last	
D-3110: SP-70 external speaker Matches TS600 & TS700A. Classy!	Was $48.60 Now $32.00 SAVE $16.60 while stocks last	
D-3106: TS600A 6m version of above 10 watts, all modes 50 — 54MHz	Was $699.00 Now $565.00 SAVE $134.00 while stocks last	
D-3200: TR-3200 UHF transceiver Go up to 432MHz: FM unit.	Was $305.00 Now $249.00 SAVE $56.00 while stocks last	
D-3211: Mobile mount — 2200/3200/1300 Keep your rig from sliding around the floor!	Was $16.80 Now $15.00 SAVE $1.80 while stocks last	
D-3210: TR2200 hand held fm, 2m 12 channels (1 supp) 2W output.	Was $192.00 Now $179.00 SAVE $13.00 while stocks last	
D-3215: TR-7200 2m fm transceiver 22 channel (1 supp) rugged construction	Was $260.00 Now $199.50 SAVE $60.50 while stocks last	
D-3400: TR-7400 2m fm synthesised 25 watts output, 800 channels	Was $429.00 Now $395.00 SAVE $34.00 while stocks last	
D-2807: Daiwa SR-9 2m receiver tuneable, can be converted to other bands.	Was $118.00 Now $99.50 SAVE $18.50 while stocks last	
D-5500: HC-500 antenna tuner 500W max, perfect 1:1 match to any trans.	Was $166.50 Now $115.00 SAVE $51.50 while stocks last	
D-3502: TV-502 2 metre transverter plug into 520, 820 & many others,	Was $275.00 Now $245.00 SAVE $30.00 while stocks last	
D-2114: CW FILTER YG-88C for TS820 500 Hz filter sharpens CW response.	Was $64.00 Now $49.00 SAVE $15 while stocks last	
D-5202: SP520 remote speaker for TS520 Matches TS-520 style. Looks good!	Was $39.50 Now $35.00 SAVE $4.50 while stocks last	

ROCK BOTTOM ROCK PRICES . . .

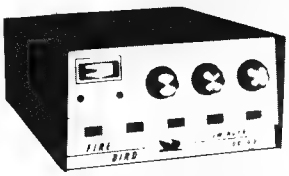
I must have rocks in my head to sell them at these ridiculous prices. Crazy!

D-6321	Rptr 1	Suit Multi 7; should suit TR2200A & 2200G (some xtals may need re-trimming) Tx xtals fit KP-202 Rx xtals fit Daiwa SR-9 WERE: $9.00 NOW: $4.75 SAVE $4.25	$4.75 Pair
D-6322	Rptr 2		
D-6323	Rptr 3		
D-6324	Rptr 4		
D-6325	Rptr 5		
D-6326	Rptr 6		
D-6327	Rptr 7		
D-6328	Rptr 8		
D-6329	Rptr 9		
D-6330	Simp 40		
D-6335	Simp 50		
D-6336	Simp 51		
D-6421	Rptr 1	Suit Multi 16 & Multi 11, receive xtal MAY fit KP202. Rx xtals fit all ICOM units with trimmer adjustment WERE: $9.00 NOW $4.75 SAVE $4.25	$4.75 Pair
D-6422	Rptr 2		
D-6423	Rptr 3		
D-6424	Rptr 4		
D-6425	Rptr 5		
D-6426	Rptr 6		
D-6427	Rptr 7		
D-6428	Rptr 8		
D-6430	Rptr 10		
D-6436	Simp 51		
D-6438	Rptr 9		
D-6340	Chan 2	Fit IC-22; Rx xtals may fit Multi 11 & Multi 16 with trimming	$4.75 Pair or each as applies
D-6340	Chan 8		
D-6340	147.0 Rx		
D-6340	145.9 Tx		
D-6340	146.5 Rx		
D-6278	8.7515	Fit FT-101 series — novice xtals	$8.00 each
D-6283	8.8830		
D-6288	8.8800		
D-6273	8.7300		
D-6182	28.2MHz	Experimental xtals, some can be used for converting 'CB' to novice frequency.	$7.00 each
D-6290	35.895MHz	Originally for TS520 (S), use as experimental xtals.	~~$14.50~~ $3.00 each

NOTE! Where it is suggested that crystals from one unit may fit another, this information is supplied on an advisory basis only, and cannot be guaranteed.

XXXX SPECIAL

APOLLO LINEAR



was $299.50

now $199.50

Cat D-2544.

The Firebird: 200 watts of muscle on 40 to 10 metres from just 3 watts of drive. Features receive pre-amp & rugged construction. 240V.

SAVE $100.00

ONLY A FEW LEFT — BE QUICK FOR THIS ONE!

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JOHN MOYLE MEMORIAL NATIONAL FIELD DAY CONTEST RESULTS — 1978

24 HOUR DIVISION

SECTION (a) — TX PHONE

VK4XZ	2282	
VKLX	1927	
VK4AYL	937	
VK3YQ	522	
VK4AHO	190	
VK4ABQ	140	

SECTION (b) — TX CW

VK3XU	570	

SECTION (c) — TX OPEN

VK5OR	1820	
VK6TJ	1436	
VK4AAR	1371	
VK3AYL	683	

SECTION (d) — TX MULTI-OPERATOR PHONE

VK3ATL	12852	16 ops.
VK4AAQ	4404	6 ops.
VK1ACA	4373	4 ops.
VK3BML	3888	10 ops.
VK5KT	3559	9 ops.
VK3ANR	3079	4 ops.
VK5LZ	2995	3 ops.
VK3XK	2911	5 ops.
VK2BXD	2605	4 ops.
VK3BGG	2459	4 ops.
VK7AX	752	2 ops.

SECTION (e) — TX MULTI-OPERATOR OPEN

VK3APC	7706	14 ops.
VK3ATM	7174	16 ops.
VK4WIT	5639	12 ops.
VK2WG	4825	8 ops.
VK1WI	3737	
VK2ADZ	3294	6 ops.
VK5WC	3254	6 ops.
VK2AWF	3201	
VK3DC	1858	6 ops.

SECTION (f) — TX VHF MOBILE/PORTABLE

VK1ACA	1844	
VK3AVJ	1732	
VK3BER	544	
VK7ZLB	363	
VK4ADW	362	
VK4ZJP	344	
VK3ZAO	292	
VK4PV	282	
VK4HS	120	

SECTION (g) — HOME TX STATIONS

VK5QX	1465	
VK3XB	1080	
VK3BME	280	
VK1NAO	275	
VK3ZCB	220	
VK7NFR	180	

SECTION (h) — RECEIVING OPEN

S. W. Russell (VK3)	1715	
E. W. Trebilcock L300042	120	

6 HOUR DIVISION

SECTION (a) — TX PHONE

VK3BIR	1015	
VK2AHV	801	
VK4QH	776	
VK1GM	679	
VK4ADC	614	
VK2JM	517	
VK2ARZ	389	
VK7HK	302	
VK3EF	175	

SECTION (b) — TX CW

NIL

SECTION (c) — TX OPEN

VK2EL	1054	
VK3BIR	1045	
VK1RC	802	
VK3RV	679	
VK3VF	638	

SECTION (d) — TX MULTI-OPERATOR PHONE

VK4PJ	784	2 ops.
VK3ATO	591	3 ops.
VK4AMA/MM	577	2 ops.

SECTION (e) — TX MULTI-OPERATOR OPEN

VK3UV	1552	3 ops.
VK5KR	1276	6 ops.

SECTION (f) — TX VHF MOBILE/PORTABLE

VK3ZJS	779	
VK4ZMG	564	
VK4ZCB/2	515	
VK4DT	316	
VK3YGB	310	
VK2EL	92	
VK6ZHM	44	

SECTION (g) — HOME TX STATIONS

VK2BVJ	600	
VK3YLD	330	
VK3KS	310	
VK7RY	120	
VK6TU	105	

SECTION (h) — RECEIVING OPEN

R. W. Middleditch (VK3)	410	

CHECK LOGS

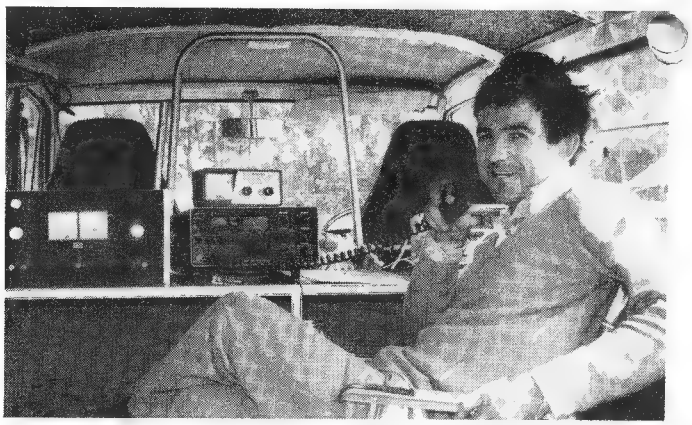
VK3AEU, VK3YAY, VK5QX, D. J. Forbes L30728.

These results are provisional, as leading scores are subject to further checks. ■

VK3AUI checking logs.

GEELONG AMATEUR RADIO CLUB VK3ATL OPERATED FROM MOUNT COWLEY IN THE OTWAY RANGES

Geelong ARC 15 Mx operator Daryl VK3AQR hopping in for his 'chop'.



Mike VK3ASQ was GARC's 6 and 2 Mx operator using an FT620B and FT221.

QSP

GOLD COAST HAMFEST

The Gold Coast Radio Club will hold a Hamfest on Saturday, 29th July. The venue will be a country property and in addition to the usual trade displays there will be a wide range of side shows and old-time dancing. The Hamfest will be used as a means of publicising amateur radio to the public and local organisations. The organiser is Ken Ayers VK4KD, 121 Nerang Street, Southport 4215.

ZL 10 METRE BEACON

The 10 metre beacon ZL2MHF situated on Mount Climie is now operating on a frequency of 28.23 MHz. In order that the propagation on the 10 metre band can be investigated it would be appreciated if signal reports of the beacon could be forwarded either by the Bureau or direct to the Secretary, NZART Branch 63, PO Box 40212, Upper Hutt, New Zealand.

LINEARS IN CANADA

According to Ham Radio Jan '78 point of sale control for linear amplifiers has been instituted by the Canadian Department of Communications. All buyers of linears must sign a special form which is forwarded to DOC for checking purposes.

PREFIXES

If you hear a prefix in the series H5A-H5Z this may be from an operator in newly independent Bophuthatswana. No ITU confirmation was available.

ARE YOU REPORTING INTRUDERS TO THE INTRUDER WATCH CO-ORDINATOR? IF NOT — WHY NOT?

IARU NEWS

The next IRAU Region 3 Conference will be held in Bangkok from Friday, 6th October, to Tuesday, 10th October, 1978. The host society will be the Radio Amateur Society of Thailand, under the capable leadership of President Kamchai Chotikul HS1WR and Secretary Edward Rose HS1ALF.

The WIA will be represented by the Federal President, David Wardlaw VK3ADW. David Rankin 9H1RH/VK3QV is Secretary of the R3 Association, and the Directors are Masami Saito JH3PJE, Michael Owen VK3KI, Tom Clarkson ZL2AZ, and Ton Lian Huat 9V1OD.

The latest member of the ITU is the Republic of San Marino. The membership now totals 153.

Two new members of the IARU Region 3 Association are the Papua New Guinea ARS and the Korean ARS Inc. The President of PNGARS is [illegible] Smith P29JS and of KARL is Mrs. Young-Hee [illegible] HM1YL.

A new member to IARU is the Royal Omani ARS, making the total 98. The Organisasi Amatir Radio Indonesia has applied for membership.

IARU Region 1 has three new members, Botswana ARS, The AR Association of Bahrain and the Sierra Leone ARS, making that Region's total 46 altogether. Three additional societies are expected to join Region 1 in the near future — The Turkiye Radyo Amatorleri Cemiyeti, the Royal Jordanian Radio Amateur Society and the Royal Omani ARS.

IARU Region 2 next conference is due to be held from 3rd to 8th September 1978 in Panama City and the Region 1 conference in Hungary will have been concluded when you read this. All these Regional conferences are triennial.

Acknowledgements for most of this to IARU Region 3 Newsletter No. 6. ■

INTRUDER WATCH

Alf Chandler, VK3LC

[illegible] METRE BAND CLEARED OF FOREIGN BROADCASTS

Wouldn't it be wonderful to read the above one day? It could well come true if enough of us were to lodge formal complaints through the WIA Intruder Watch network, so that our P. and T. Department could initiate action at the international level in conjunction with the other administrations who are already working on it.

This month would you please co-operate by letting me or your Divisional Co-ordinator have specific reports on the following broadcast stations:

7010—Radio Peking — best identified in English at 2000Z following the Peking bells after the "Internationale" has been played.

7065—Radio Tirana — identifies in English at 0630Z, 2055Z, 2208Z, but has been heard at 1630Z.

7070—Radio Republic Indonesia — identifies in English at 1200Z and 1300Z.

Alf Chandler VK3LC
Intruder Watch Co-ordinator.

In case you do not know your Divisional Co-ordinator, here is the list —

VK1AOP—Ted Pearce, 45 Carnegie Cres., Narrabundah, 2604.

VK2AFG—Les Weldon, 11 Raymond Ave., Northmead, 2152.

VK3XB—Ivor Stafford, 16 Byron St., Box Hill, 3128.

VK4KX—Murray McGregor, 6 Murray St., Red Hill, 4059.

VK5LG—Leith Cotton, 64 Weroona Ave., Parkholme, 5043.

VK6WT—David Couch, 9 The Grove, Wembley, 6014.

VK7MX—Max Ives, PO Box 12, Devonport, 7310.

VK8HA—Henry Andersson, Box 1418, Darwin, 5794.

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

GENERAL RULES FOR THE ARI HF AWARDS (as received)

The following general rules apply to all HF awards issued by the Associazione Radiotecnica Italiana (ARI) and should be read together with the conditions which govern each individual certificate.

1. All enquiries should be addressed to the ARI HF Awards Manager, G. Nucciotti I8KDB, via Fracanzano, 31-80127 Napoli, Italy, together with one IRC (2 IRC for airmail reply outside of Europe).
2. ARI HF Awards will be issued to any amateur who will submit to the manager —
   A letter, dated and signed, with applicant's name, address and call. He must certify to have complied with all rules governing amateur radio service in his own country and to have kept fair play and good sportsmanship in operating toward the Award for which the application is claimed.
   The complete list of QSLs, with call sign, date, frequency, reports, time and type of emission (CW, AM, SSB, RTTY).
   QSL cards for checking.
   10 IRC or $1 for foreign applicants. The "Guglielmo Marconi Award" is free (only mail fee).
   QSL cards must be submitted without corrections, erasures or additions and must be clearly readable. If the type of transmission is not shown, two figures (RS) count as Phone (AM, not SSB) and three (RST) as CW.
3. To get an award in a specific class, the cards must show the corresponding data in clear manner.
4. Following decisions of IARU Region 1, all foreign applicants can avoid to send QSL cards by submitting a check list of the cards duly Amateur Radio Society. ARI HF Manager reserves the right to check, on request, one or more QSLs.
5. ARI HQ decisions are final.
6. Any falsification of cards will result in disqualification.
7. Application shall be sent to the address of ARI HF Award Manager as per point 1. It is suggested in order to safeguard your QSLs, etc., to send applications by registered mail.
   These rules apply from 1st January 1977.

CERTIFICATO DEL MEDITERRANEO (CDM)

1. The CDM is issued to those amateurs who can show confirmation of a two-way contact on the HF bands since 1-6-1952 with
   (a) A fixed amateur station in at least 22 countries of the list (pay attention, in the list there is no peninsular Italy).
   (b) At least 50 amateur stations of peninsular Italy (total 72 QSL).
2. The same station may be worked once only.
3. The CDM is issued in 2 classes:
   (a) Mixed (AM, SSB, CW, RTTY).
   (b) Phone only (AM, SSB).
4. The minimum reports considered are: RST 338 and RS 33.
   List of countries:

Spain	Crete
Balearic Islands	Mount Athos
Ceuta and Melilla	Turkey
Morocco	Syria
France	Yugoslavia
Algeria	Albania
Corsica	Malta
Sardinia	Gibraltar
Sicily	Cyprus
Lebanon	Monaco
Egypt	Tunisia
Greece	Israel
Dodecanase Islands	Libya

CERTIFICATO DEL MEDITERRANEO/SWL (CDM/SWL)

1. The CDM/SWL is issued to those SWL who can show confirmation of a HRD since 1-1-1960 of 14 countries of the CDM list.
2. The award is not divided into classes.

"BACK TO DARWIN AWARD"

100 awards will be issued by the Darwin Amateur Radio Club for working Club Members in the greater Darwin area during the month of May 1978, which is the official "Back to Darwin" month of festivities which marks the completion of the rebuilding of Darwin after cyclone 'Tracy' which devastated the city on Christmas Day 1974.

Requirements for the issue of the award:

VISITING AMATEURS:
Free to visiting amateurs after working five club members in the greater Darwin area on VHF, HF, or eye-ball QSO with five club members.

All VK8 stations outside one kilometre radius of Darwin, and all other VK, P29, and ZL stations contact five club members in the greater Darwin area on any band, two CW and three phone contacts. Cost fifty cents or 5 IRCs.

DX STATIONS:
Work three CW and two phone club members in the greater Darwin area. Cost 15 IRCs.

LOGS:
Send a list of stations worked stating call sign, date, band, and time in Zulu. Do not send QSL cards.

SEND LIST TO:
Awards Manager, c/- Box 1418, Darwin, N.T. 5794. ■

20 YEARS AGO

Ron Fisher, VK3OM

APRIL 1958

"Is the Australian Amateur Abreast with Communication Progress", so asks the Editorial page of April 1958 Amateur Radio. Communication Progress is defined as general developments in the world of commercial and amateur communications. Perhaps the most interesting statement is contained in the last paragraph of the Editorial. "Your Executive has assiduously pressed for issue of 'Novice' licence. Our reasons are not altogether selfish, a fact that is borne out by the support we have received from the defence services who realise that in an emergency the Amateur is a trained specialist capable of immediate assimilation into the communication branch".

Propagation Study on 3.5 and 7 MC. Hans Albrecht put forward some thoughts on long distance low frequency DX working. The Chordal-Hop theory suggested that the wave could be reflected along the ionospheric layer without touching the ground.

VK6EC's Amateur Television, part two, discussed the Vidicon Camera with complete details of its construction includuing details of the deflection coils and viewfinder.

Results of the 1957 VK-ZL DX Contest were announced. The call area winners on CW were VK's 2GW, 3DQ, 4NL, 5KU, 6RU and 7UW. Australian top score was VK9XK. In the phone section, VK's 2AOU, 3HL, 4TN, 5WP, 6RU, 7LZ and 9BW.

Frank O'Dwyer VK3OF reported in his VHF notes that six metres had been open to JA with signals peaking over S9. Also VK4's had worked into KH6, in one instance using only 5 watts and a dipole. SWL, George Palmer of Williamstown, Victoria, had heard mobile police cars from Kansas on 45 MHz.

Two reports of alert amateur operators aiding emergency situations were published in April 1958 AR. VK7AJ picked up a distress signal from a motor cruiser off the New South Wales coast. The message was relayed to a freighter which located the vessel and towed it to port. In Queensland, amateur operator Dr. J. Kelly, no call sign mentioned, cleared a radio link being jammed by ZL amateurs operating on the frequency. ■

WARC 79 WARC 79 WARC 79 WARC 79

USE THEM OR LOSE THEM

WARC 79 WARC 79 WARC 79 WARC 79

QSP

SWL's

AR is your magazine. It is good or bad depending entirely upon what material is given to it by members. The Publications Committee help to put it together and do contribute towards some of the columns. However, there is nobody available to write material suitable for SWL's. Since the author of "Newcomers Notebook" was transferred away from Melbourne no-one can be found to take his place, especially as his articles required very little, if any, editing and he knew exactly what was needed for AR and how to write it. Do you know anyone interested and capable of helping in this area? **(Yes, we could fill AR with reprints from overseas magazines, but we feel members do not want this. — Ed)**

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded. Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

FT401 Tcvr, $450. Heathkit DX6$ AM/CW 60 watt Tx, with xtals, 80m to 10m, $70. VK2AAB, QTHR. Ph. (02) 487 1428.

Antennas: 13 el. 144 MHz yagi on 22 ft. boom, $25; 10m Zel. beam cut for OSCAR, $20; 1296 MHz 3 ft. 6 in. dish, $10; 3 el. 144 MHz yagis for 'sniffing", $1 ea.; 432 MHz VK3 solid state converter, 50 MHz or 10.5 MHzi.f., $15 or $22; 144 MHz fox hunt converter, inc. attenuators, 3.5 MHz i.f., $15; Comb generator, 1 MHz-UHF, $10; standard racks, enclosed type, $15 and $20; 3 CX100 A5 (e.g. 2C39), new, $5 ea.; Modulator for 150W, inc. UM3 transformer, $10. Many other bits. Bob VK3AOT. Ph. (03) 697 6011 (bus.), 787 6426 home).

ICOM IC22-A VHF Transceiver, complete with mobile monting bracket, microphone, power lead and operator's manual. Fitted with xtls for repeaters 2, 3, 4, 5, 6, 7, 8 and Simplex 40 and 50. Excellent value at $175. Contact Brian VK2BCI, Wollongong. Ph. (042) 28 4935.

Yaesu FT101B Transceiver, complete with all crystals and morse key. Mint condition. Price $585. Ph. (05) 52 3402.

Collins KWM-2 SSB/CW Transceiver, serial number 15294, Collins PM-2 power supply, Collins 312B-3, Collins CC-1 carrying case. Absolutely mint condition, $2,150. VK2JO. Ph. (02) 36 7756.

Toroids, similar to p. 581 of 1977 ARRL Handbook. Take legal power 1.8 to 30 MHz, $7.55 ea., plus p. and p. 40c for one, 60c for two. Geoff Forest VK3AGF, QTHR. Ph. (03) 379 6524.

FT75B with mobile power supply and two extra xtals on 10m. VXO range extended to cover 20 kHz on 80m, 25 kHz on 10m. 3 months old, but only used on two ocasions. Price $400. P. Drady VK2NIE, Gillard's Road, Nana Glen, 2493. Ph. (066) 54 3206.

Kenwood TS520S, brand new, must sell. $670. B. R. Kendall VK3ZDM. Ph. (03) 741 2382.

Yaesu FT75B HF Transceiver, with AC and DC power supplies, small SWR bridge, 3 xtals on 20, 40, and 80m, one each on 15 and 10m. Little use, $400. VK2AOE, QTHR. Ph. (02) 449 6364.

Yaesu FT2FB 2m Xcvr, channels 2, 8, 40, $135. VK3NJ. Ph. (03) 546 4924.

QM70 high power 28-144 MHz Transceiver, plugs straight into most Yaesu transceivers, $150; Ken KP202 2m hand-held charger, manual, 6 channels, $135. Swan WM 1500 in line RF power meter, 5, 50, 500, 1500 watt ranges, $50. VK30M, QTHR. Ph. (03) 560 9215.

Swan 700CX plus 230VC and speaker, little used, $600; HAM-M plus cable, $150; HP524B, $120, including video amp., 100 MHz and period modules. VK2ZBB, Box 330, Hurstville, 2220.

Astor Video Camera with monitor, solid state, $130, ONO; Philips 1676 txcvr AM 53.032 with xtals, $35; 4m 20 hiband FM txcvr, $15 each, ONO; AWA MT20 with 52.525 Rx xtal, $12; 6m AM base station in rack, best offer; general coverage Rx Geloso, front end, $30, ONO; C42 txcvr, 36-70 MHz, with aerial tuning unit and mains PS, $55, ONO; Marconi Rx type AD94 150Kc-18.5 MHz, $20; 19 in. rack, 5 ft. high, best offer. Jan Esselstrom VK3ZUE. Ph. (03) 82 1261, ext. 222 (Bus.) (03) 233 5471 (A.H.).

Kenwood TS600 6m all mode Tcvr, 7 months old, immac. cond., inc. VOX 3 and 5 el. beam, manual, leads, carton, $550. Very poor VHF, QTH. N. E. Mattick, VK2ZLL, QTHR. Hargraves, NSW, 2850.

AWA RX Test Oscillator, 390-470 MHz, 240V operation, $30; pair of Sanyo 5W 6 chanel, 27 MHz walkie-talkies, near new, $75 each; pair of Contact 1W walkie-talkies, new, $40 each; National radio cassette, dual power, excellent condition, $70; DC power supply, less power transformer, 13.5V 20A home brew (see AR July 1974), works well, $80. VK4XT, QTHR, or PO Box 496 Dalby, 4405. Ph. (074) 62 2389.

SSTV Monitor, robot model 70A, $300; Drake TC2 transverter and CCI VHF console, 300W PEP on 144-148 MHz, $300. VK5AS, QTHR. Ph. (086) 82 2899.

Dish — 2m diam. dish with feed and mounts. Slightly damaged, $25, ONO. Ph. (03) 598 8112 (A H.).

Rx: Kenwood QR666, $150; Barlow Wadley, XCR30, $180. Both as new. K. Brooks, 74 Sunshine Avenue, Brighton, S.A. 5048. Ph. (08) 296 2803.

Eddystone Rx 640, continuous coverage 160m-10m AM CW; also 2 Geloso VFOs, 80 to 10m bands, sundry valves and components, now surplus. Inspect at QTH. VK3LV, QTHR.

Kenwood TS520S, only 2 weeks old and in absolutely as new condition, inc. Yaesu base mic., new pair of 6146B finals and 6 month guarantee, $720. Ph. Bert (03) 42 5312 or 758 4086 (A.H.).

Depth Sounder/Recorder, Marlin DIR60, as new, in carton, or exchange for 2m rig. VK3NFR, 118 Geelong Road, Torquay. Ph. (052) 61 2446.

FT200 with power supply and handbook, good condition, recently re-aligned, $330; BC348 Rx complete with spare valves and manual, $30. VK2AJF, QTHR. Ph. (02) 525 8203 (A.H.).

Self Study Novice Kits, containing Westlake's theory text plus elementary YRS theory notes; txet of 1000 Novice questions, all multiple choice; Morse text and two C60 cassettes and kit, handbook. Price $15 posted. W. Wilson, VK2ZCA/NMW, YRS Service Officer, PO Box 109, Toongabbie 2146.

IC502 6m SSB Txcvr, 12 months old, $170. VK2YDY, QTHR or Ph. (067) 52 1185.

Colour TV 9" NTSC, $150. B&W TV 12" HMV (needs new tube), $25. B&W TV 5" (used as mon.), $25. B&W TV monitor, $40. Rx EA 240, part completed, $45. Pattern Gen. ETI, $15. TV Sync. Gen. (homebrew), $60. 10 A&R PC1 Cases, $25. MISC. 3cm Microwave Gear, $50. Vinten RCU4 Remote Control Unit, $50. VK3ZXF, QTHR. Ph. (03) 560 3527.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. D. H. FISHER	**VK7AB**
Mr. R. C. ELLIS	**VK2AHR**
Mr. F. G. CLISSOLD	**VK2AJI**
Mr. V. FITTON	**VK2SF**
Mr. A. C. (Eddy) EDWARDS	**G6XJ**
The "Eddy" in Eddystone.	
Mr. V. FITTON	**VK2SF**

Icom IC22A 10W 2m Mobile, fitted for repeaters 1-8, reverse repeaters 2-8 and Simplex 37, 40, 43, 49, 50, 51, with manual, mike etc., $200. Ray VK1ZJR, QTHR.

Atlas 210X with PS and dig. readout, $800. Microwave modules MMT432/28S, $190. VK3BIY, Ph. (03) 370 2161.

Janel Laboratories Model 30PB 28-30 MHz low noise Oscar pre-amplifier, new and complete with unused BNC connectors, 12V DC operation, $35. Ross Treloar VK2BPZ. Ph. (02) 239 5267 (bus.).

Teletype Machines, ASR33 and ASR38, both fully serviced and overhauled, $500 and $630. VK3ZUI. Ph. (03) 51 1156 AH.

FTV650, compatible Yaesu FT100 series, only had 8 hours work, $165, connecting cord, plugs, circuit. VK4DU/P2. Ph. (02) 326 1178.

2m IC22 Transceiver with repeaters 2, 3, 4, 5, 6, 7, 8, Simplex 49, 50, 51. Had little use, good condition, complete with original carton and manual, $190. VK3ZEF, QTHR. Ph. (03) 876 1987.

WANTED

Enthusiasts to use Morse practise tapes. C60 cassettes at speeds 5 to 12 words per minute. Cost $2 tape posted. Specify speed when ordering. Orders to F. Santos VK2ZOU, WIA Education Service (NSW) Tapes Officer, 8 Cooper Street, Blacktown 2148.

Mast, 25-30 ft., triangular lattice preferred, rotator and 10-15-20 beam. Will purchase as package or separately. VK5JI, 7 Richardson Avenue, Glenelg North 4045. Ph. (08) 295 8094.

For restoration of No. 19 Mk. 2 Tcr., meter and valve covers, cables, headset, microphone, etc. Colin Gracie, Cavendish PO, 3408.

Transceiver VHF, low band, 30-50 MHz, FM, VFO or xtal controlled, solid state, ex-army or commercial construction. Please forward particulars price to Doug Johnson VK3YMG, 25 Verney Ro Shepparton, Vic. 3630. Ph. (058) 21 2309.

Collins Mech. Filter, 455 kHz B/W 2.1 kHz, with or without crystals. VK2BDD, QTRH. Ph. (02) 529 4356.

Small general coverage RX valve or transistor. Morse keys, Clipsal-PMG 1940 or similar. VK3WW, QTHR.

30/40 MHz Frequency Counter as Mar./April 1973 AR. Either part completed kit or completed. VK2ZUL, QTHR. Ph. (066) 47 7220.

FT101B in good working condition, complete, VK3AWU, QTHR. Ph. (03) 211 1169 bus; (03) 762 4055 AH.

Power Transformer 20-24V, sec. at 15-20A. VK2BET, QTHR. Ph. (02) 476 2933.

Ken KP202 hand-held FM Transceiver. VK2ZQC. Ph. (02) 81 2143 AH.

Vinten MTR20 Carphones, preferably unmodified in going order. Jeff VK3ZJS. Ph. (03) 337 1536.

Mosley TA33 Junior Beam or information re Australian source of supply. Ray VK3RF, QTHR. Ph. (03) 878 5305.

1155A Rx, not necessary to be in working order. VK3ATK, QTHR. Ph. (03) 570 2184 (A.H.).

TR10, TS500, details, condition, accessories, modifications. Reasonable price please. Will acknowledge all mail. VK6RD, QTHR.

HF Transceiver, preferably covering all 3 Novice bands; will pay $150. Ring and negotiate, p.m. only. Lawrence Brown. Ph. (03) 783 2264.

A big wave maker in the world of amateur radio . . . FT-101E HF transceiver

from Yaesu and Bail — New shipment with more effective noise blanker exclusive to Bail Electronic Services.

The success story of the export quality FT-101 must make world amateur radio history. First produced in 1970 the FT-101 has been refined and improved to make it better than best for your money. The latest FT-101E represents tried and proven performance and real value. You'd have to say it will be the best selling HF amateur transceiver in the world.
The FT-101E can be modified to suit novice requirements.

It comes complete with **a more effective noise blanker specified by, and exclusive to, Bail Electronic Services**; R.F. Speech Processor, Calibrator, matching Yaesu Hand Microphone, eight pole SSB filter, 12v DC-DC converter as well as **234v AC** operation with Australian approved 3 core cable and 3 pin plug, **factory produced English language handbook** (not a photo-copy!), spare plugs and connectors, etc.

Features:

* Built-in AC & DC power supplies
* Built-in RF-speech Processor for increased talk power (E model only)
* 260 Watts PEP SSB, 180 Watts CW, & 80 Watts AM
* Factory sealed, solid state VFO for optimum stability and accurate 1 kHz readout
* Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
* Built-in, fully adjustable VOX
* Automatic break-in CW operation with sidetone
* Selectable 25 kHz and 100 kHz calibrator
* ±5 kHz receiver clarifier w/separate ON/OFF switch
* Built-in WWV/JJY reception
* Heater switch to shut off final tubes for conservation of current drain
* Reliable easy to operate lever switch
* Adjustable carrier level for tune-up and novice operation
* Built-in speaker
* High-Q, permeability tuned, RF stages to provide the performance required even in base station operation
* Includes dynamic, hand-held type microphone
* Indicator lights for internal VFO and clarifier operation
* Eight pole SSB filter for unparalleled selectivity on today's crowded bands
* All-mode operation — SSB, CW, & AM
* Built-in internal crystal control provision and Dual VFO adaptor
* Complete line of compatible accessories for flexible station design

Price $895.00 — 90 day warranty. Price includes sales tax. Freight and insurance extra. Prices and specifications subject to change without notice.
Write for new Yaesu Catalogue detailing this and other sets in the Yaesu range. Please include 40¢ postage.

JAS7778-48

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W.A.	Radio Communication Services, H. R. PRIDE, 26 Lockhart St., Como, 6152	Ph. 450 4379
	WILLIS TRADING CO., 429 Murray Street, Perth 6000	Ph. 21 7609
S.A.	FARMERS RADIO PTY. LTD., 20 Stanley St., Plympton 5038	Ph. 293 2155
TAS.	G. T. ELECTRONICS, 131 Westbury Rd., South Launceston 7200	Ph. 44 4773
	PRINS RADIO, 123 Argyle Street, Hobart 7000	Ph. 34 6912
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot 2020	Ph. 667 1650
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills 2147	Ph. 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West 2302	Ph. 69 2040
	RIVERCOM, Sid Ward, 9 Copland St., Wagga Wagga 2650	Ph. 21 2125
QLD.	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion 4010	Ph. 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip 2606	Ph. 81 2824 82 2864

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FT-7

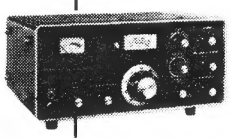
FEATURES:
Modern compact styling for easy under-dash mounting.
Size 230mm x 80mm x 290mm.
80 to 10 metre operation.
VFO controlled.
Noise Blanker that really works.
Facilities for fixed channel operation.
Ideal for the shack or the mobile at a price that you can afford.
Only $548 including mobile mount, microphone and cables.

LOOK AT THESE PRICES AND COMPARE!!

FT-101E	160-10m x 260W Tcvr	$839
FT-301	160-10m x 200W T[illegible]	$878
FT-301S	160-10m x 25[illegible]	$649
FT-7	80-10m x 2[illegible]	$548
TS-520S	160-10m [illegible] Tcvr	$699
FL-2100B	80-10[illegible] Linear Amp	$539
FL-110	16[illegible] Linear Amp	$235
FRG-7	[illegible] MHz Comm Rx	$325
YO-301	[illegible] series Monitorscope	$375
YO-100	[illegible]01 series Monitorscope	$263
YP-150	Dummy Load/Wattmeter	$ 97
FP-301	301 series 20Amp PS	$163
FT-901DM	160 – 10mx Tcvr	$1475

WHY PAY MORE?

FAMOUS YAESU FT–101E TRANSCEIVER

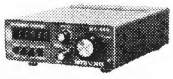


Yaesu's latest model FT–101E from GFS comes to you at a price that is very hard to beat.

For Instant 260 watts PEP operation on 160 through 10 metres just add 12 Volts DC or 234 Volts AC.

The FT–101E's updated RF SPEECH PROCESSOR provides that extra 'talk power' needed to cut through most of those bad pile ups and heavy QRM. **Only $839**

NEW! COMBINATION FREQUENCY COUNTER AND SIGNAL GENERATOR – DX-555D



Featuring a 220 MHz counter upper limit and 30 MHz generator upper limit.

Generator frequency is read directly on the counter.

A MUST FOR EVERY HAM SHACK.
$213

Technical Data:
10Hz to 220MHz counter.
0.4 to 30 MHz generator.
600Hz tone oscillator.
2mS and 200mS gating time.
5 Digit LED display.
Switchable KHz and MHz

DX-555 same as DX-555D but with 30MHz counter.
Only $175

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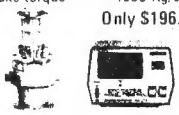
YP-150

EMOTATORS ROTATORS

MODEL 502CXX Heavy duty.
Rotation torque – 600 Kg/cm
Brake torque – 4000 Kg/cm
Only $196.



MODEL 1102MXX Extra Heavy Duty
Rotation torque – 800 Kg/cm
Brake torque – 10,000 Kg/cm
GFS Price only $314

MODEL 103LBX Medium duty.
Rotation torque – 450 Kg/cm
Brake torque – 1500 Kg/cm
GFS Price only $145

Where do you get an 80 to 10 metre trapped vertical antenna complete with guy ropes and radial traps for only $113? At GFS of course. *
KB-105 – $113.

YAESU

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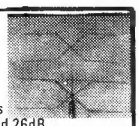
Sick of yelling your head off at those rare DX stations while others are getting 5/9 reports from them? Then get with it!! The manufacturers state 14dB forward gain and 26dB front to back ratio.



SQ-20	– 20 metre Swiss Quad	– $255
SQ-15	– 15 metre Swiss Quad	– $137
SQ-10	– 10 metre Swiss Quad	– $128

ACCESSORIES FROM GFS

FS-301 HF In-line power and SWR meter. 3 ranges: 0-20, 200, 1000W – **$49**
FS-302 VHF In-line power and SWR meter, 50-170MHz – **$58**
SWR-15 SWR/Field strength meter 3.5 to 150MHz – **$15.50.**
SWR-200 Osker Block SWR/POWER meter – **$69**
QTR-24 24 Hour World Clock – **$31.**
5D-FB low loss double shielded foam dielectric Co-ax, 2 dB loss per 100 ft. at 100MHz. **$1.20 per metre.**
LP-30 low pass filter, 50W power capability. Ideal for novice use – **$9.50.**
VS-1 mini mic compressor, 46dB of compression – **$25.**
MC-801 Katsumi mic compressor – **$45.**

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FS-302 – $58
50-170MHz

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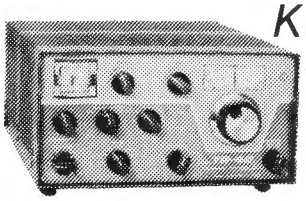
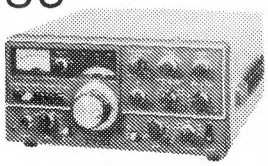
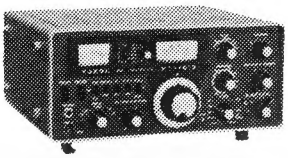


DRAKE Model TR-4C
Sideband Transceiver

USED TEST INSTRUMENTS
Level meters, oscillators, V.T.V.M., morse key, electronic keyers, matching networks, HF and VHF antennaes



KENWOOD TS 520S
SSB Transceiver



YAESU FT101E SSB Transceiver

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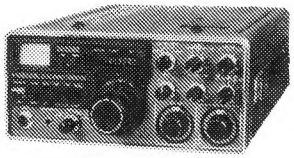

KENWOOD TS 700S
2m All mode Transceiver

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